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DETERMINANTS OF BONDHOLDER WEALTH EFFECTS IN CORPORATE RESTRUCTURINGS: EVIDENCE FROM SPIN-OFFS AS COMPARED TO MERGERS AND ACQUISITIONS

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by

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Dedication

This dissertation is dedicated to my parents, my husband Maneesh, and daughter Mansi. Their love, support and encouragement have always been the source of my inspiration.

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DETERMINANTS OF BONDHOLDER WEALTH EFFECTS IN CORPORATE RESTRUCTURINGS: EVIDENCE FROM SPIN-OFFS AS COMPARED TO MERGERS AND ACQUISITIONS

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This dissertation investigates the effects of mergers and acquisitions and spin-offs on the firm and its debtholders. This paper analyzes changes in the firm characteristics including capital structure, business risks, and operating performance. I develop a theoretical model that predicts the relationship between cross-sectional firm characteristics and the changes in wealth of the original bondholders (of the parent/acquirer firms) that have publicly traded outstanding nonconvertible debt at the time of a spin-off and merger/acquisition respectively. The empirical analysis shows wealth effects on the original bondholders of the parent/acquirer firm. Monthly bond returns are calculated relative to the announcement date for a sample of firms that have undertaken a spin-off or

merger/acquisition. The results show a cross-sectional variation in the reaction to the announcement. The cross-sectional firm characteristics that determine the magnitude of these effects are identified. A parent firm's pre-spin-off leverage, change in leverage, and change in operating efficiency as a result of the spin-off are important determinants of wealth distribution to bondholders in these corporate restructurings. The results of this study provide evidence that different value drivers, depending on the type of restructuring, determine bondholder wealth effects. In spin-offs, the leverage effect is the predominant determinant of bondholder wealth. In mergers and acquisitions, the change in business risks primarily influences the effect of the merger on bondholder wealth. Bondholders gain more in focus-increasing spin-offs and in focus-preserving (nonconglomerate) mergers.

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Chapter 1: Introduction

Any restructuring of a firm affects not only shareholders, but also other stakeholders. Classic microeconomic theory presumes that firms act solely to maximize shareholders' wealth or firm net present value. Yet, Jensen-Meckling's (1976) exploration of the agency relationships of corporate organization suggests that incentive conflicts can motivate maximization of stockholder wealth or management wealth at the expense of firm value maximization. In a similar vein, Bulow and Shoven (1978) analyze situations where management is induced to maximize wealth of debtholders. Thus, the existence of incentive conflicts provides a variety of motivations for corporate restructuring.

This study tests the prediction of many of the currently held theories by analyzing the effects that corporate restructurings have on the firm's characteristics and thereby on the market prices of the firms' outstanding publicly traded nonconvertible debt. The focus in the study is on two types of restructurings including mergers and acquisitions and spin-offs.

Recent research investigates the wealth effects on investors by exclusively considering either mergers and acquisitions or spin-offs, but not both.[1] This study analyzes the effects of each type of restructuring and compares the results across both. It examines whether announcement returns are particular to spin-offs or whether they accompany other restructuring events that involve a change in the form of outstanding securities. From an operational perspective a merger is the

[1] See Chapter 2 on literature review for a detailed discussion of the studies on spin-offs and merger and acquisitions that study wealth effects.

opposite of a spin-off; in the former case two companies become one, and in the latter case one company becomes two. Yet, from a debtholder perspective, both types of restructurings share an important similarity in that both involve a change in the business units of the acquirer/parent firm. This change can further be accompanied by a change in the capital structure, business risks, and/or operational efficiencies of the acquirer/parent firm. A merger/acquisition may be viewed as an exchange of riskless assets for risky physical assets and a divestiture as just the reverse.

An interesting question is whether the announcement returns are unique to a particular type of restructuring or whether they accompany other restructuring events that also involve a change in the form of outstanding securities. In a stock-for-stock merger, for example, the bidder company issues its own stock in exchange for the target company's stock, which ceases to exist. In contrast, in a spin-off a new public entity is created.

The conflict of interest between a firm's bondholders and its stockholders is discussed by a number of authors. Black (1976) points out "there is no easier way for a company to escape the burden of a debt than to pay out all of its assets in the form of a dividend, and leave the creditors holding an empty shell". A spin-off is a mode of corporate restructuring in which a part of the assets of a company are spun-off and the subsidiary shares are distributed to parent shareholders. The bondholders of the parent firm cannot claim any assets of the new firm and lose a part of the collateral underlying their claims. Schipper and Smith (1983), Hite and Owers (1983), Parrino (1997), Dittmar (2000) analyze the effects of spin-offs on

the existing bondholders of the parent firm. This study investigates the wealth effects of both spin-offs and mergers and acquisitions on the existing holders of the outstanding publicly traded nonconvertible bonds of the parent/acquirer firm.

Although spin-offs have a potential to shift wealth from debt to equity holders, the effects of a spin-off on the organizational structure of the firm is far more than a simple division of assets. Spin-offs affect a number of the characteristics of the parent firm. For example, management's ability to finance a firm's assets could improve because of the spin-off's resultant reorganization. A subsidiary with higher business risks would limit the ability of the parent to raise cheap capital. Investors can demand a higher risk premium because of the higher risk of the combined firm. By spinning off the subsidiary, a parent could ensure that its capital costs are kept in control. The spin-off could be structured so that post-spin-off the parent is left with a lower debt to equity ratio or a higher interest coverage ratio. A spin-off could also change the operational efficiency of the firm by removing negative synergies between the parent and the subsidiary or by realigning managerial motivation.

Different firm-level effects of the spin-off could affect the wealth distribution to bondholders. This dissertation predicts a theoretical model and explores the relationship between cross-sectional firm characteristics and the wealth effects of the spin-off on bondholders.

With respect to mergers and acquisitions, although financial theorists have examined corporate mergers from many different perspectives, most models predict one of two primary effects: (1) Either mergers create net new wealth from

operating or financial synergies or (2) they redistribute existing wealth between stakeholder classes. Although empirical support exists for both these effects, it is challenging to examine wealth creation and wealth transfers in a single analysis. This study extends the existing theoretical models to allow for an analysis of the two predicted effects of corporate restructurings on debtholders in a single framework by building a model of the relationship between changes in firm characteristics and their expected effect on the wealth of existing debtholders of the acquiring firm.

The empirical analyses show bondholder wealth effects of both mergers and acquisitions and spin-offs. The use of a comprehensive corporate bond data set that supplies trader-quotes around the corporate restructuring event allows improvement on the poor quality of bond data. Such an improvement affects the results of many prior studies on bondholder wealth. Trader quotes for bond prices, returns, and ratings data is collected for the outstanding publicly traded nonconvertible bonds of the firms in the spin-off and mergers and acquisition sample. The use of trader quotes provides bond prices around the restructuring event that better reflect the response of investors in the bond markets to the changes in the parent/acquirer firm. It is therefore possible to analyze the wealth effects of corporate restructuring events on debtholders by using a more extensive sample of nonconvertible bonds and parent/acquirer pairs.

Changes that occur in the parent/acquirer firm structure as a result of the spin-off/merger and acquisition are also investigated. The empirical chapters of this dissertation test whether excess bond returns are related systematically to any

underlying variables that characterize the parent/acquirer firm. The cross-sectional firm characteristics that determine the magnitude of bondholder wealth effects are identified and the sensitivities of the wealth effects to the firm-level characteristics are measured.

This study finds evidence of reactions in the bond markets to both types of restructurings. The average reaction of the holders of the outstanding nonconvertible bonds of the parent firm to the spin-off announcement is significantly negative in the month of the announcement. For the sample of matched-acquirer firms, although the bondholder reaction is insignificant in the announcement month, a significant negative reaction is observed from three months before to two months after the merger announcement. There also exists a cross-sectional variation in the reaction to the announcement. Forty-one percent (37%) of the parent spin-off firms (bonds) have a positive response to the spin-off announcement, while 59% (63%) of the parent spin-off firms (bonds) exhibit a negative return. Similarly for the matched merger sample, 47% (49%) of all acquirer firms (bonds) exhibit a positive reaction, while 53% (51%) of the acquirer firms (bonds) exhibit a negative reaction.

The restructurings affect both parent and acquirer firm characteristics. There is a significant change in total debt, size and leverage. For spin-offs, the parent firms' size, total debt, and leverage significantly decrease, while in mergers and acquisitions, the acquirer firm's size, total debt, and leverage exhibit a significant increase. Operating performance, as measured by the industry-adjusted

ROA, of the matched-acquirer firms has a significant decrease in the year following the merger announcement.

Pre-spin-off leverage, change in leverage, and change in the operating efficiency of the parent firm as a result of the spin-off are important determinants of the distribution of wealth to bondholders in spin-offs. While in the case of mergers and acquisitions, change in variance and change in operating efficiency of both acquirer and the target firms affect bondholder returns. The bondholder wealth effects are driven by the change in the business risks of the acquirer rather than by changes in leverage of the acquirer.

With respect to mergers and acquisitions, a focus-increasing or a focus-preserving merger (i.e., a nonconglomerate merger) exhibits a greater improvement in operating performance of the acquirer firm. The implication is that holders of outstanding bonds could expect higher gains in a nonconglomerate merger than in a conglomerate merger. The significant positive coefficient on the change in the target firms' industry-adjusted ROA implies that existing bondholders of acquirer firms share in the merger's resultant synergy that leads to better overall operating performance.

The organization of this dissertation is as follows: Chapter 2 reviews prior empirical and theoretical research on spin-offs and mergers and acquisitions and discusses the implications of the existing theoretical models. Chapter 3 discusses the potential effects on bondholders' wealth of spin-offs and mergers and acquisitions. I also develop the parameters of a comprehensive model to study both negative as well as positive effects on bondholders' wealth. The relationship

between the firm-level changes and the expected changes in the wealth of existing debtholders of the parent/acquirer firm is examined through the framework of a model. This theoretical model is empirically tested in the subsequent chapters. Chapter 4 describes the spin-off and mergers and acquisition data sample as well as the bond returns data set. Chapter 5 presents results surrounding the announcement period for the spin-off sample as well as for the matched-acquirer firm's sample. Chapter 6 documents the effects of the restructuring on the parent and acquirer firms. Chapter 7 tests the predictions of the theoretical model for the changes in parent/acquirer firm characteristics that could influence the wealth effects of spin-offs on bondholders. I test the relationships between changes in parent/acquirer firm characteristics and wealth effects of the parent/acquirer firm bondholders and the wealth. The results from the analyses on the spin-off sample and the merger and acquisition datasets are then compared. Chapter 8 summarizes the findings and the implications of this study.

Chapter 2: Review of previous research on corporate restructurings

2.1. MOTIVATION FOR SPIN-OFFS

A spin-off does not alter the composition of assets supporting the original shareholder claims. A spin-off, however, does alter contracts among stockholders, creditors, managers, and regulators. The motivation behind a spin-off could influence the effects of the spin-off on the different parties that contract with the firm. A number of hypotheses have been proposed to explain the increases in shareholder wealth that accompany spin-offs. One set of hypotheses argues that potential shareholder wealth gains in spin-offs are due to expropriation of bondholder wealth. Other hypotheses argue that spin-offs gains are attributable to the relaxation of regulatory or tax constraints, facilitation of mergers, correction of previous managerial mistakes, or better management focus after the spin-off.

H1. Expropriation effects hypothesis. Spin-offs result in a transfer of wealth from bondholders to stockholders resulting from the transfer of wealth to captive finance subsidiaries. Hite and Owers (1983) study bond price reactions around spin-off announcements and do not find the expected negative reaction of bond prices to support this hypothesis. Schipper and Smith (1983) also find no evidence of wealth transfer from their study of bond ratings and bond prices around spin-off announcements. Parrino (1997), however, finds a significant decline in the value of Marriott's bonds following its spin-off announcement. He concludes that the initial wealth transfer to Marriott's shareholders was largely dissipated in

litigation and other transaction costs. Maxwell and Rao (2002) also find evidence that the value gain to stockholders is negatively related to the value loss to bondholders. However, even accounting for the bondholders' loss, the aggregate value of the publicly traded debt and equity increases on a spin-off announcement, suggesting that the wealth transfer hypothesis can only partially explain stockholder gains in spin-offs.

H2. *Gains from relaxation of regulatory or tax constraints hypothesis*. Schipper and Smith (1983) find some evidence in support of this hypothesis, particularly for a subsample of firms. But they observe this to be a partial explanation. Hite and Owers (1983) find negative cumulative abnormal returns for the group of firms that mention legal/regulatory difficulties as the reason for the spin-off.

H3. *Mergers facilitation*. Spin-offs provide a method of transferring control of corporate assets to bidders. Cusatis, Miles and Woolridge (1993) find that post-spin-off nearly 15% of both parents and subsidiaries become takeover targets. They propose that takeover activity leads to the positive abnormal returns for up to three years beyond the spin-off announcement date. In such a case, the spin-off could decrease the asset base underlying bondholders' claims.

H4. *Clientele hypothesis.* Vijh (1994) documents ex-date excess returns of 3% for spin-offs, along with increased trading volume, excess volatility, and higher bid-ask spreads. He suggests that the higher volume on the ex-date, inspite of a 3% price discount before ex-date, indicates a clientele effect. The parent and subsidiary stock can be followed by different analysts and attract different investors. A spin-off announcement tells the market that the two businesses will

separate and that a package of stocks will be unbundled. Vijh argues that the imminent unbundling makes it attractive for potential buyers to wait until the ex-date. Although, he argues potential sellers should act before the ex-date. He therefore attributes spin-off ex-date returns to market imperfections that result in many investors being interested in one (but not both) of the post-divestiture shares.

H5. Correction-of-a-mistake hypothesis. Allen, Lummer, McConnell, and Reed (1995) propose that spin-offs represent the undoing of an unwise takeover. They find that spin-offs that began as acquisitions have excess returns negatively correlated with original acquisition announcement excess returns. However they do not find evidence to support the hypothesis that excess returns for spin-offs that began as acquisitions is larger than those for spin-offs that were not acquisitions.

H6. Refocusing the firm hypothesis. Schipper and Smith (1983) suggest that spin-off gains might result from the decrease in the number and diversity of transactions under one management. However, they have no rigorous test for this hypothesis. Hite and Owers (1983) show some support based on the positive excess returns for the group of firms that state specialization as the reason for the spin-off. Daley, Mehrotra, and Sivakumar (1997) find support for the hypothesis that cross-industry spin-off distributions, where the continuing and spun-off units belong to different two-digit Standard Industry Classification (SIC) codes create more value than own-industry spin-offs, through improved operating performance.

H7. *"Information content" hypothesis*. Nanda and Narayanan (1997) formally develop the information related argument for divestitures through a model of asymmetric information about firm value between the managers of the firm and the market. They assume that the market can observe the aggregate cash flows of the firm but not the individual divisional cash flows. This results in misevaluation of the firm's securities. If a firm requires external capital to finance growth opportunities, then an undervalued firm will resort to raising capital either through a divestiture or after a divestiture, and an overvalued firm will resort to an equity issue without separating its divisions. The implication in the context of spin-offs is, that since the divestiture does not generate cash inflows to the firm, undervalued firms requiring capital would first engage in a spin-off to attain fair market value for their shares and then issue equity to raise capital.

2.2. MOTIVATIONS FOR MERGERS AND ACQUISITIONS

A review of financial literature suggests the following major motives for mergers and acquisitions: the synergy motive, the agency motive, and the hubris hypothesis. The synergy motive suggests that mergers occur because of economic gains that result by merging the resources of the two firms. The agency motive suggests that mergers occur because they enhance the acquirer management's welfare at the expense of the acquiring firm's shareholders. The hubris hypothesis suggests that managers make mistakes in evaluating target firms and engage in acquisitions even when there is no synergy.

Synergy motive. The synergy motive proposes that managers of target and acquirer firms maximize shareholder wealth and would engage in merger activity only if it results in gains to both sets of shareholders. In a synergistic acquisition the value of the combined firm is greater than the sum of the values of the individual firms (Bradley, Desai, and Kim, 1988). The additional value, or synergistic gain, is derived from an increase in operational efficiency, an increase in market power, or some form of financial gain. Operational synergies can be driven by economies of scale. The theory of operational synergies as a motive for mergers is based on a number of major assumptions. It first assumes that economies of scale do exist in the industries of the merging firms. Second, the theory postulates that prior to the merger involved firms operate at levels of activity that fall short of achieving the potential for economies of scale. Basically, economies of scale involve "indivisibilities" (such as people, equipment, and overhead), which provide increasing returns if spread over a large number of units of output. Financial synergy encompasses the potential for achieving a lower cost of capital as a result of the reduced risk of bankruptcy when imperfectly correlated cash flow streams are joined.

Agency Motive. Some theorists suggest that acquisitions can be primarily motivated by the self-interests of the acquiring managers. Several reasons explain this motive. Among them are diversification of management's personal portfolio (Amihud and Lev, 1981), use of free cash flow to increase the size of the firm (Jensen, 1986), and acquiring assets that increase the firm's dependence on the management (Shliefer and Vishny, 1990). The basic idea in all of these

explanations is that acquisitions result in the extraction of value from the acquiring firm stakeholders by acquirer management. For example, " specialist" managements acquire firms in their own lines of business so that the success of the combined entity will depend even more on their specific skills. The management can exploit this dependency to increase perquisite consumption or defeat rivals who are better than itself in running some of the operations of the firm. Such management actions result in agency costs that reduce the total value of the combined firm available to the stakeholders.

Hubris hypothesis. The hubris hypothesis maintains that acquisitions are motivated by managers' mistakes and that there are no synergy gains (Roll, 1986). It assumes that the valuation of the target is a random variable whose mean is the current market price and that takeover premiums merely reflect a random error. Roll argues that although acquirer managers can make errors of overvaluation or undervaluation, the observed error is typically in the same direction. The left tail of the distribution of valuations is truncated by the current market price. The hubris hypothesis predicts that the entire premium paid to the target firm is a transfer from the acquirer.

2.3. PRIOR EMPIRICAL RESEARCH

2.3.1. Spin-offs and shareholders

A number of studies show the effects of spin-off announcements on shareholder wealth. Hite and Owers (1983) report an event-period excess return of 3.30% surrounding first announcements and 7.00% over an extended period

beginning fifty days before the first announcement and ending on the completion date when the spin-off becomes certain. Schipper and Smith (1983) show a two-day excess return of 2.84% and Miles and Rosenfeld (1983) report 3.34%. Cusatis, Miles, and Woolridge (1993) report that both spin-offs and their parents offer significantly positive abnormal returns for up to three years beyond the spin-off announcement date, even after adjusting for takeover premiums.

2.3.2. Spin-offs and bondholders

Most studies examine the issue of corporate restructuring through spin-offs under the assumption that the firm is one homogeneous unit whose clear objective is to maximize its market. With a few exceptions, prior studies focus on the effects of spin-offs only on stockholders. However, in a growing body of literature (Black, 1976; Fama, 1978; Fama-Miller, 1972; Galai-Masulius, 1976; Jensen-Meckling, 1976; Kalay, 1982; Myers, 1977; Smith-Warner, 1979), researchers recognize that the firm is a collection of groups whose interests can, and do, conflict. Of the groups comprising the firm, the largest and perhaps the most important two are the bondholders and the stockholders. The effect of spin-offs on the wealth of bondholders is an interesting issue in its own right and must be addressed to determine the effect of spin-offs on total firm value. Bondholders represent one of the most important primary stakeholder groups. Relatively few prior studies look at the impact of spin-offs on the outstanding bonds of the firm.

Schipper and Smith (1983) study bond price and rating behavior around spin-off announcements. Of their sample of 93 firms that had spin-offs during the period 1963 to 1981, the bond price (rating) data is very limited. The bond prices

are obtained from the *Wall Street Journal* for 16 nonconvertible bonds for four firms that had voluntarily announced spin-offs. For eight of the sample nonconvertible bonds, there is evidence of a decline in bond value at the spin-off announcement. Bond ratings are obtained for 19 bonds (including both convertible and nonconvertible bonds) for 16 firms. Schipper and Smith report that only two bonds (of the same firm) experience a decline in bond rating the year after the spin-off announcement. They interpret the low sample frequency of declines in bond prices and ratings associated with spin-off announcements as not suggestive of a widespread reduction in bondholder collateral.

Hite and Owers (1983) further study the bondholder wealth effects of spin-off announcements by examining returns around the spin-off announcement date for senior securities (including preferred stocks). These senior securities include both the convertible and nonconvertible bonds and preferred shares. Of their total sample of 123 spin-offs during 1963 to 1981, they find only 31 firms with a total of 53 publicly traded issues at the time of the spin-off announcement. These issues consist of 15 straight bonds, 17 convertible bonds, five straight preferred stocks, and 16 convertible preferred stocks. The authors encounter the problem of infrequent trading activity in these issues as the senior security price data is collected from the *Wall Street Journal* and from *Compuserve Inc*. Hite and Owers handle the infrequent trading problem by smoothing the returns, i.e., over any interval. If the security trades on day t-n and next day t, they treat the return not as a single observation but an n-day return such that an unbiased estimate of the return on day t is simply the n-day return divided by n. They compute mean

cumulative prediction errors during the event period from day –10 to day +10. If the security trades on day *t-n* and next on day *t*, they compute a prediction error only for day *t* as follows:

$$PE_{jt} = R_{jt}(n) - n\tilde{m}. \quad (1)$$

where $\tilde{m}$ is the estimate of the mean from the estimation period of 40 days from day – 50 to day – 11. On the day of the announcement, they find the mean cumulative errors are not significantly different from zero. They conclude that if senior security prices react instantaneously to the release of information, then they do not find evidence to support H1, the expropriation hypothesis, which states that gains to the stockholders occur at the expense of senior security-holders.

In contrast, Parrino (1997) shows a wealth transfer from bondholders to shareholders and a decline in the total value of the firm following the spin-off announcement by Marriott in October 1992. Unlike the previous studies, which examine the relatively few debt issues that are traded on the New York Exchange, Parrino uses dealer bid prices to determine changes in the value of Marriott's 13 senior note and debenture issues that were outstanding at the time of the spin-off announcement. The dealer bid price data reveal that the prices of all of Marriott's fixed-income securities declined during the three days following the spin-off announcement. The aggregate market-adjusted value of the 13 senior notes and debentures fell 16.51% ($333.3 million), suggesting there was a wealth transfer to the shareholders. The magnitude of the bondholder and preferred shareholder loss exceeded the common shareholder gains. Parrino suggests that all of the

shareholder gains resulted from a wealth transfer. One reason for the decline in the value of Marriott's debt was the low coverage ratio of the parent after the spin-off. Moreover the spin-off also increased the average variability of the parent's cash flows by distributing the businesses with the most stable cash flows to the spun-off entity, and thereby increasing the riskiness of the cash flows underlying the bondholder claims.

More recently, Maxwell and Rao (2002) test the wealth expropriation hypothesis (H1) that stockholder gains on the announcement of a spin-off are due to a wealth transfer from bondholders to stockholders. They find evidence consistent with wealth expropriation. Using the Lehman Brothers Bond Database for bond data, which they consider to have more accurate bond price data than exchange traded price data, they examine the stock and bond returns for a sample of 80 firms that announced a spin-off between 1976 and 1997.[2] Bondholders of the firms in their spin-off sample, on average, suffer a statistically significant negative abnormal return of 0.88% during the month of the spin-off announcement, while stockholders on average gain a statistically significant 3.6%. They interpret these results to suggest that spin-offs on average may expropriate wealth from bondholders, but it is only a partial explanation of the gains to stockholders. They also test for factors that influence relative wealth changes for bond and stockholders. They find that bondholder losses (stockholder gains) are significantly influenced by loss of collateral and by financial risk. Loss of

[2] The Lehman Brothers Bond Database is the same database as the Fixed Income Database used in this dissertation. Maxwell and Rao (2002) use a sample of spin-offs announced between 1976 and 1997. I use a sample of spin-offs announced and also completed between 1979 and April 30, 1998.

collateral is measured by size of the assets in the spin-off entity relative to the pre-spin-off firm. The degree of financial risk is measured by high pre-spin-off leverage ratios of debt-to-equity and debt-to-market value of equity, and alternatively by low pre-spin-off bond ratings (non-investment grade). They find the negative relation between the leverage ratios and abnormal bond returns consistent with the idea that the increased gains to stockholders of firms with greater leverage is due to the higher degree of wealth transfer from bondholders. They do not find any difference in the returns to bondholders based on whether the spin-off is cross-industry versus same-industry. Therefore they do not support the hypothesis that the loss of coinsurance effect to bondholders in a cross-industry spin-off could yield potentially higher wealth transfer effects to shareholders compared to same-industry spin-offs.

2.3.3. Mergers and acquisitions and bondholders

Empirical studies of mergers and acquisitions indicate that bondholders generally earn normal or positive abnormal returns around the merger announcement date. The studies of Kim and McConnell (1977), Asquith and Kim (1982), and Dennis and McConnell (1986) use an event study methodology and find that bondholders neither gain nor lose following mergers. The first two studies examine conglomerate mergers; Dennis and McConnell (1986) examine conglomerate and nonconglomerate mergers. Bondholders earn normal return regardless of bond rating or issuer status (i.e., acquiring or target firm). The authors conclude that managers often neutralize wealth transfers to bondholders by increasing firm leverage, but they do not test this hypothesis directly. Asquith

and Kim (1982) and Dennis and McConnell (1986) test whether bond returns are related negatively to the issuer's stock return (evidence of incentive effects) or the correlation between the stock returns of the two merging firms (evidence of the coinsurance effect). Neither variable is found to be statistically significant.

Sweeney (1991) examines the sequence of events implied by the increased debt capacity hypothesis as a motive for conglomerate merger. His hypotheses are that the merger should

- Decrease the earnings variability of the acquiring firm;
- Increase the firm's leverage ratio; and
- Not reduce shareholder wealth.

He finds that only eight of the 23 conglomerate mergers he examines meet all of these conditions, a proportion too low to support the increased debt capacity hypothesis.

Settle, Petry, and Hsia (1984) examine conglomerate as well as nonconglomerate mergers. They find that bondholders gain when the combined pre-merger debt ratio (defined as the sum of the long-term debt of both merging parties divided by the sum of their total assets) of the merging firms is greater than 20%. Bondholders earn normal returns when this ratio is less than 20%. They do not test the impact of leverage changes on bondholder wealth for individual firms.

Eger (1983) finds that bondholders earn positive abnormal returns following pure stock exchange mergers. Her hypothesis is that bondholders gain because pure stock exchange mergers are associated with lower incentive effects

than mergers that involve cash or new debt securities. In contrast Travlos (1987) finds that the nonconvertible bondholders of acquiring firms earn normal returns following cash offers and negative abnormal returns following stock exchanges. He argues that these results are consistent with the Myers and Majluf (1984) signaling hypothesis.

Rathinasamy, Philippatos, and Shrieves (1991) use the pre-merger debt ratios, the cash flow variances and the cash flow correlations of the merging firms to estimate the potential debt capacity of merging pairs. They find that bondholders earn normal returns when actual debt levels are greater than potential debt capacity, and bondholders earn positive abnormal returns when actual debt levels are below potential.

Walker (1994) reports a significant amount of variation in bond returns (following corporate takeovers) than do the conclusions drawn from previous studies. He finds that though nonconvertible bondholders do not gain or lose in the aggregate, bond returns are related inversely to issuer default risk. Low quality bonds (rated BBB or below) tend to gain from takeovers, and high quality bonds (rated A or above) tend to lose. He also finds some evidence that bondholders earn larger excess returns when mergers increase the firm's leverage ratio. He interprets this result as being more consistent with the Myers and Majluf (1984) signaling hypothesis.

With the exception of Walker (1994), almost all of the studies previously cited use an event study methodology. Most studies also analyze the various subsamples using an event study methodology. For example, Settle, Petry and

Hsia (1984) differentiate between low debt and high debt merging pairs, Rathinasamy, Philippatos, and Shrieves (1991) divide their sample by potential debt capacity, and Travlos (1987) and Eger (1983) group bondholders by payment method (cash or stock). These subsamples, however, represent only indirect tests of incentive effects.

2.4. THEORETICAL MODELS OF WEALTH TRANSFERS IN CORPORATE RESTRUCTURINGS

Black and Scholes (1973) were among the first to suggest that the equity in a levered firm can be thought of as a call option. When shareholders issue bonds, it is equivalent to selling the assets of the firm to the bondholders in return for cash (the proceeds of the bond issues) and a call option. The bondholders have claims to the assets but not control over the assets. If shareholders unexpectedly reduce the asset base of the company, then the bondholders have less collateral. For example, in a restructuring through a spin-off, a portion of the parent firm's assets is spun-off into a new public entity. Depending on the division of debt between the parent and the subsidiary, the original bondholders of the parent firm might not have any claims to the assets of the subsidiary, thereby resulting in a dilution of their claims. Another way shareholders change bondholders' claims is by increasing the book value debt-to-equity ratio while restructuring the business units of the firm. This maybe done by issuing additional debt and using the proceeds to the benefit of the shareholders. If the new debt has equal claims on those assets, then the original bondholders end up with a partial to the assets of

the firm, whereas before the new debt was issued, they had complete claims on the assets. This puts the original bondholders in a riskier position as they are unable to charge more for the extra risk because the discounted value of their bonds has already been paid. Consequently, the market value of the bonds of the original bondholders will fall. At the same time, the market value of the firm's stock increases as a consequence of the restructuring. Thus a portion of the shareholder's wealth increase can be attributed to the loss in wealth of the original bondholders. This is called the *wealth transfer hypothesis.* The theory of option pricing argues that in a world with no transaction costs or taxes, the wealth of shareholders is increased by greater financial leverage.

2.4.1. The combined Option Pricing Model and Capital Asset Pricing Model applied to pricing of securities in spin-offs

Galai and Masulis (1976) present a theoretical model of corporate security pricing that combines the Option Pricing Model (OPM) with the Capital Asset Pricing Model (CAPM). This theoretical model is constructed as follows.

Consider a firm with one pure-discount bond issue and one common stock issue. The bond with the face value C will mature at T (i.e., T periods from the present), which is also when the firm is liquidated. In the intervening periods there are no net cash flows or dividends paid to the shareholders. Black and Scholes (1973) observe that under this set of simplifying assumptions, the common stock can be regarded as a European call option, where the underlying asset is the firm. The owner of a call option has claim to the slice of a stock's price distribution to the right of the exercise price at maturity date T. Similarly, a firm's stockholders have claim to the slice of the firm's distribution to the right of

the face value of the firm's debt at its maturity date. The stockholders can be viewed as holding an option to buy back the firm from the bondholders for an exercise price equal to the face value of the firm's debt C at time T. If the value of the firm at maturity V_T is above C, the equity will have a positive value; if it is below, the stock is valueless. In other words, the stockholders have protection against depreciation of the firm's value below C (the limited liability nature of equity) and have a right to any appreciation in the firm's value above C.

The Black-Scholes option pricing model for European-type options can then be applied to the equity of the firm.

$$S = VN(d_1) - Ce^{-r_F T} N(d_2), \tag{2}$$

$$d_1 = \frac{\ln(V/C) + \left(r_F + \frac{1}{2}s^2\right)T}{s\sqrt{T}}, \tag{3}$$

and

$$d_2 = d_1 - s\sqrt{T}\,. \tag{4}$$

where V is the current value of the firm, σ^2 is the instantaneous variance of percentage returns on V, C is the face value of the debt which is the exercise price of the option, T is the time to maturity, r_F is the riskless interest rate, and $N(\bullet)$ is the standardized normal cumulative probability density function.

Assuming that the firm's asset value is unaffected by its capital structure it can be shown that the debt of the firm has the value

$$D = V - S. \tag{5}$$

$$D = VN(-d_1) + Ce^{-r_F T} N(d_2). \tag{6}$$

Merton (1974) further shows that

$$\frac{\partial D}{\partial V} = 1 - \frac{\partial S}{\partial V}, \frac{\partial D}{\partial C} = -\frac{\partial S}{\partial C}, \frac{\partial D}{\partial r_F} = -\frac{\partial S}{\partial r_F}, \frac{\partial D}{\partial s^2} = -\frac{\partial S}{\partial s^2}, \frac{\partial D}{\partial T} = -\frac{\partial S}{\partial T}. \quad (7)$$

Using the comparative static results derived for call options by Black-Scholes (1973) and Merton (1973), the effect of the parameters of the Option Pricing Model on the value of the stock can be studied. It can be shown that

$$1 \geq \frac{\partial S}{\partial V} \geq 0, \frac{\partial S}{\partial C} < 0, \frac{\partial S}{\partial r_F} > 0, \frac{\partial S}{\partial s^2} > 0, \frac{\partial S}{\partial T} > 0. \quad (8)$$

This means that the value of the stock is an increasing function of the value of the firm, the riskless interest rate, the variance of the percentage return of the firm, and time to liquidation; and it is a decreasing function of the face value of the debt.

Galai and Masulis (1976) prove that if the systematic risk of the firm ? V is constant over time, then the instantaneous risk of the equity will not necessarily be stable or known with certainty for the time period in question. Combining the results of CAPM and that of the OPM, they prove that

$$b_S = N(d_1) b_V \frac{V}{S} \equiv h_S b_V. \quad (9)$$

The systematic risk of the equity is greater than or equal to the systematic risk of the firm (for $\beta_V > 0$). If the systematic risk of the firm is assumed to be stationary, then the equity's systematic risk will be nonstationary and

$$\frac{\partial b_S}{\partial V} < 0, \frac{\partial b_S}{\partial C} > 0, \frac{\partial b_S}{\partial r_F} < 0, \frac{\partial b_S}{\partial s^2} < 0, \frac{\partial b_S}{\partial T} < 0. \quad (10)$$

Combining this with $D = V - S, D = VN(-d_1) + Ce^{-r_F T} N(d_2)$ yields the result

$$\frac{\partial b_D}{\partial V} < 0, \frac{\partial b_D}{\partial C} > 0, \frac{\partial b_D}{\partial r_F} < 0, \frac{\partial b_D}{\partial s^2} \gtreqless 0, \frac{\partial b_D}{\partial T} \gtreqless 0. \quad (11)$$

This in turn leads to $b_S^A > b_S^G$ and $b_D^A > b_D^G$ if the leverage of the firm increases.

Let us assume that firm G is composed of two economically independent divisions A and B. Since the two divisions are economically independent, then

$$V_t^G = V_t^A + V_t^B \text{ and } \quad 0 \le t \le T \quad (12)$$

At time 0,

$$V_0^G = V_0^A + V_0^B \ . \quad (13)$$

At time 0, assume that firm G unexpectedly spins off division B, so that G is now composed solely of division A. The capital structure design of the new firm entity B is such that the distribution of the debt of firm G to firm B is not proportional to the assets distributed. This assumption is not critical as long as even if there is a proportional distribution of debt to assets between the parent firm G and firm B, the riskiness of the assets distributed among the two firms is not the same. Post spin-off the variance of the cash flows of the parent firm G is much higher than the pre spin-off variance. Let,

$$C_G = C_A . \quad (14)$$

where C_A is the face value of debt maturing at time T. As a result of the spin-off the debtholders of A (who were the original debtholders of firm G) find that their position has deteriorated because fewer assets now serve as collateral for the debt. Furthermore, the leverage V/C of the firm has gone up due to the loss in assets, so

$b_S^A > b_S^G$ and $b_D^A > b_D^G$, since β is increasing in leverage as shown in the previous chapter.

Moreover, the variance of the firm's rate of return will, in general, change ($s_A^2 \neq s_G^2$) due to the spin-off. If $s_A^2 > s_G^2$, then it can be proved that $D_0^A < D_0^G$ and $S_0^A > S_0^G$[3]. The proof is based on the fact that option value is an increasing function of the variance of the underlying security. Even, if we assume, for simplicity, that the variance remains constant, i.e., $s_A^2 = s_G^2$, the change in the betas yields

$$D_0^A \leq D_0^G . \tag{15}$$

Along with Eq. (13) this implies that

$$S_0^A + S_0^B > S_0^G . \tag{16}$$

Thus, the value of the holdings of the equityholders of firm G, who now own equity in firms A and B, will increase at the expense of firm G's debtholders.

2.4.2. The combined Option Pricing Model and Capital Asset Pricing Model applied to pricing of securities in mergers

Galai and Masulis (1976) extend the option pricing and CAPM analysis to the case of conglomerate mergers. They investigate the effects of a pure conglomerate merger in a perfect capital market on the values of the equity and debt of the two firms involved in the transaction. As the merger is defined as a conglomerate type, they assume that there is no economic synergy effect. They

[3] Galai and Masulis (1976): $s_G^2 = a\, s_A^2 + (1-a)s_B^2 + 2(1-a)a\,COV(r_V^A, r_V^B)$

prove that merger of two firms (A and B) with less than a perfect correlation of their returns will decrease the variance of the new combined firm and thus reduce the value of the unprotected equity and increase the market value of debt. The risk of the combined firm G is smaller than that facing each of the individual firms, A and B, separately. Therefore the market value of firm G's bonds is greater than the sum of the market values of the bonds of firms A and B. Their promised terminal values are the same. On the other hand, the market value of firm G's stock is smaller than the sum of the values of firms A and B's stock by an equal amount.

Thus in the case of a conglomerate merger, if investors are unprotected against changes in the volatility of their holdings, the value of their holdings might be changed. The underlying assumptions are that each bond of the two original firms is exchanged for a bond of identical face value, with the same seniority and maturity, and guaranteed by the new firm. Also, stock in the new firm is distributed according to the relative equity value of the two firms before the merger is announced. Under these assumptions the stockholders' position can be expected to deteriorate with the unanticipated announcement of a merger between A and B, due to the lower variance of the new firm G's rate of return. The bondholders of the merged firm G have a decreased risk of bankruptcy. Rubinstein (1973) points out that bondholders of the merged firm receive more protection since the stockholders of each of the merging firm have to back the claims of the bondholders of both companies. The stockholders' limited liability is weakened.

Galai and Masulis (1976) suggest that an alternative solution to this refinancing problem is to retire the existing debt of the merging firms (A and B) and then to issue firm in the new combined entity G with a market value equal to the preexisting debt of firms A and B. An interesting question also is how security holders will be compensated so that they will have no incentive to block a conglomerate merger. One way to answer this is by issuing more debt with the same seniority and retiring a certain fraction of the merged firm's equity. By doing so, the value of the original bonds will decline. This process can be continued until the original bondholders' holdings have a market value identical to their combined market value before the merger took place. The net result will be an increase in the debt-equity ratio of the merged firm. In other words, by increasing the debt-equity ratio of the merged firm, the market values of the original security holders can be restored to their pre-merger levels. This is consistent with the claim that mergers "allow" firms to increase their "debt capacity." In a world with corporate taxes where interest payments are tax deductible, an increase in debt capacity increases the firm's after tax value. This helps explain the motivation behind the large number of conglomerate mergers that are observed.

Galai and Masulis's (1976) results are based on both firms having a single pure discount bond outstanding, with identical seniority and maturity dates, and the same leverage ratios. Shastri (1990) examines the sensitivity of the results to these assumptions. He analyzes the financial effects of an exchange offer merger between two firms with differing capital structures and riskiness. Using Geske's

(1977) compound option framework, Shastri extends the Galai-Masulis (1976) analysis to allow for possible wealth redistribution between all security holders (i.e., between bondholders and stockholders) and between all classes of bondholders. His analyses decomposes the effect of mergers on the values of the outstanding bonds of the two combining firms and on the value of their common stock into five main components:

1. The variance effect, which is a result of the change in the variance of returns on the firm;
2. The leverage effect, which is caused by a change in the face value of debt-to-firm value ratio;
3. The maturity effect, which is caused by the different maturities of the outstanding bonds of the two combining firms;
4. The asset structure effect which is caused by the change in variance due to the retirement of the outstanding bond with the shorter maturity;
5. The synergy effect, which is caused by the fact that the market value of the combined firm is greater than the combined market values of each of the merging firm.

Shastri's (1990) simulation results suggest that, in most cases, the effect of the decreased variance dominates the effects of leverage and seniority. He also extends the pure-discount coupon case to coupon bonds and finds the basic results unchanged.

Most studies of bondholder wealth effects in spin-offs and mergers acquisitions have focused on the *wealth transfer effects.* However the next chapter

motivates how a restructuring of a firm's business units can bring about more than a simple transfer of wealth between shareholders and bondholders. A restructuring affects the firm structure in a number of ways. The resulting bondholder wealth effect is a net effect of the various changes in the firm's characteristics. This dissertation develops a model of bondholder wealth effects in corporate restructurings by decomposing the net effect into its component effects. The linkage between the effects of the restructuring on the firm level characteristics and the effect on bondholder wealth is studied at the component level. This allows the model to test for both positive and negative effects of restructurings on bondholder wealth within the same framework.

Chapter 3: Developing the parameters of the model of effects of corporate restructurings on bondholder wealth

A spin-off occurs when a company distributes the common shares it owns in a controlled subsidiary to its existing shareholders, thereby creating a separate public company (see Fig.1). At the time of the spin-off, the subsidiary becomes a stand-alone public entity that is administratively and financially independent of the parent. In effect, the consolidated firm is divided into two (or more) firms with an identical set of shareholders. In contrast to divestitures that typically involve an infusion of funds into the parent corporation, no external financing is raised in a spin-off and neither firm revalues its assets.

A spin-off is generally tax-free if it satisfies the following criteria set forth in Chapter 355 of the Internal Revenue Code: (1) The distribution must contribute at least 80% of the outstanding shares of the subsidiary, and the shares retained by the parent should not constitute "practical control" of the subsidiary (i.e., if after the spin-off the parent retains no more than a 20% interest in the voting power of all classes of voting stock and no more than a 20% interest in each class of non-voting stock); (2) both the parent and the subsidiary must be engaged in an active trade or business for at least five years prior to the ex-date; and (3) the transaction is done for sound business reasons and not as a means of avoiding taxes. Due to the strong tax incentive, most spin-offs involve the near complete divestiture of the subsidiary.

Since there is a pro-rata distribution of shares with all shareholders of the parent company receiving shares of the new entity, continuity of ownership is

maintained and any change in equity value because of the reorganization accrues to the pre spin-off equity holders.

3.1. SPIN-OFFS AND BONDHOLDERS

Since a conventional spin-off involves a "no-money" transaction, it is in effect a give-away of some of the company stock in the form of a dividend to current shareholders. Also since a part of the parent's projects are now redeployed under the spun-off unit, it is more than likely that the variance of the parent firm's cash flows changes thereby manifesting an asset substitution.

Spin-offs could also be structured such that the parent spins-off the subsidiary so as to use the subsidiary's assets in a financial strategy. There have been many spin-offs where the parent has retained a portion of the stock in the spun-off unit. This is distinct from equity carveouts where the parent firm sells equity in a subsidiary by taking it public thereby generating cash inflows for the parent. In a spin-off where the parent retains a control, there are no cash inflows to the parent because of the spin-off, however the parent acquires equity in a publicly traded firm created as a result of the spin-off. The parent can then use this equity as collateral (i.e., as an asset in fulfilling the parent company's financial requirements) for both external and continuing operations. In a tight money market, the parent can use the majority-owned stock in a public spun-off subsidiary as collateral to raise new borrowings. To the extent the new debt has the same or higher priority and is secured by the collateral created by the restructuring of assets under the spun-off unit, the old bondholders suffer a claim

dilution. This dilution exists since part of the assets underlying their claims has now been spun-off to serve as collateral for the new debt.

The stockholder-bondholder conflict in spin-offs centers around the event where the shares of the new entity are now distributed solely to the stockholders of the parent corporation. Bondholders of the firm do not get any claims to the assets of the new firm. In effect, stockholders use these transactions to move assets beyond the reach of bondholders.

For example, Marriott's spin-off (Parrino, 1997; Stark et al., 1994) is a case that highlights bondholder-shareholder conflicts. Marriott announced its plan on October 5, 1992 to spin-off, through a special dividend, into two separate publicly traded companies called Marriott International, Inc. and Host Marriott. The spin-off was accomplished through a tax-free dividend of one share of common stock of Marriott International for each outstanding share of common stock of Marriott. Marriott International consisted of Marriott's management services businesses, which represented the profitable portion of Marriott's assets. Host Marriott consisted of the remainder of the Marriott Corporation including the real estate portfolio and the airport/toll road concession operations, which constituted the financially weaker and unprofitable parts of Marriott's business. As originally described by Marriott, once the transaction was consummated, Marriott International would account for over 50% of Marriott's operating cash flow while Host Marriott was to be left with about $2.9 billion in debt and less than 50% of Marriott's operating cash flow. The Marriott spin-off's structure suggests that the division of debt, assets, and operating income between the parent

and the subsidiary can greatly affect the wealth distribution between bondholders and stockholders. In this case, intensely hostile bondholder response to the spin-off did force Marriott to make some concessions. Stark et al. (1994) note that "Marriott's spin-off is not an isolated event but rather is a reflection of an ongoing, perhaps perpetual, conflict of economic interests between bondholders and stockholders" (p. 523).

The bondholder litigation following the Marriott spin-off highlighted the event risk that debtholders of a firm face when the firm restructures through spin-offs. One of the responses observed in the bond markets which impacts the wealth of the bondholders is the effect that the restructuring has on the rating of the outstanding debt.

In Bloomberg Business News there are reports regarding companies that announced spin-offs between the October 7, 1992 Marriott announcement and November 15, 1994. Stark et al. (1994) examine the actions, if any, taken by the rating agencies after spin-off announcements. They find that of the approximately 49 companies that announced a spin-off, 17 companies had an announcement that coincided with a rating agency action. Of the 17 spin-offs, seven firms had their ratings put on credit watch with negative implications ascribed to the spin-off announcement. One had its ratings put on credit watch with negative implications by one agency but affirmed by another, while two had their ratings downgraded or put on credit watch with negative implications due to market factors other than the spin-off announcement. Of the rest, six had their ratings affirmed and one had its ratings put on credit watch with positive implications.

The initial rating agency response of putting a company on credit watch with negative implications coupled with the spin-off announcement could have an immediate negative effect on the market price at which debt trades. Such actions create obvious problems for bondholders in the short-term, even if the rating is subsequently affirmed and the price recovers. Another significant problem is the decrease in market value, which depending on the time at which the decrease occurs, can reflect on the financial statements of the holder, even if the price subsequently recovers. Another potential source of loss to bondholders is the possible drop in liquidity of the bond trades as a result of the response of the rating agencies to the spin-off.

Some examples of spin-offs that were proposed in the period following the Marriott spin-off and that affected debtholders are Skybox International, Litton Industries, Ethyl Corporation, and AT&T (See Appendix). These examples highlight the potential for loss in bondholder wealth that exists as a result of the immediate response in the bond markets to the spin-off announcement.

A number of studies show the wealth effects of spin-offs on stockholders including Hite and Owers (1983), Schipper and Smith (1983), Miles and Rosenfeld (1983), Cusatis, Miles and Woolridge (1993), Desai and Jain (1999). Relatively few researchers examine the reactions in the bond markets. Those that do include Schipper and Smith (1983), Hite and Owers (1983), Parrino (1997), Dittmar (2000), Maxwell and Rao (2002). The empirical evidence seems to indicate that parent company shareholders gain and the bondholders are unaffected by the spin-off. Although Parrino (1997) shows significant loses to

bondholders following the announcement of the 1993 Marriott spin-off. The present study focuses on the effects of restructurings through spin-offs as well as mergers and acquisitions on the wealth of the existing holders of the outstanding publicly traded nonconvertible bonds of the parent/acquirer firms.

3.2. MERGERS AND ACQUISITIONS AND BONDHOLDERS

There exists a vast body of research devoted to examining the returns to stockholders of merging firms. However, a fundamental unresolved controversy still exists concerning the impact of corporate merger/acquisition on the wealth of the debtholders of the merging partners.

Lewellen (1971) was the first to advance the idea of the co-insurance effect for corporate debt in a corporate merger. He argues that the joining-together of two or more firms whose earnings streams were less-than-perfectly correlated would reduce the risk of default of the merged firms (i.e., the co-insurance effect) and thereby increase the "debt capacity" or "borrowing ability" of the combined enterprise. He concludes that the increased total borrowing capacity of the resulting firm, in combination with the effect of tax-deductible interest payments, provides an economic incentive for shareholder-wealth-maximizing firms to engage in a merger. However, Lewellen did not examine the impact of the co-insurance effect on the value of the merging firm's already outstanding debt.

Higgins and Schall (1975) and Galai and Masulis (1976) extend Lewellen's analysis to show that the co-insurance effect can lead to an increase in the market value of the merging firms' debt and a concomitant decline in the

market value of their equity. Thus, the net financial result of non-synergistic mergers would be *a wealth transfer from stockholders to debtholders*. They conclude that unless firms can neutralize this wealth transfer they should not engage in a merger. Kim and McConnell (1977) propose that if corporate mergers produce a coinsurance effect and if firms are controlled by stockholders (or if managers at least seek to maintain shareholders' wealth, i.e., shareholder-wealth *protecting* firms), then we expect to observe merging firms taking steps to neutralize the wealth-transfer from stockholders to debtholders. One option which merging firms could avail is to increase their use of financial leverage to the point where the post-merger default risk of the previously outstanding debt is increased sufficiently to negate the co-insurance effect and to cancel any wealth transfers from equityholders to debtholders. Therefore, we would observe that (a) bondholders of merging firms do not earn any abnormal returns around the time of merger and (2) merged firms increase their use of financial leverage relative to the participating firms' pre-merger financial leverage.

Although financial theorists have examined corporate mergers from many different perspectives, most models predict one of two primary effects. Either

(1) a merger creates net new wealth from operating or financial synergies, or

(2) firms redistribute existing wealth between stakeholder classes.

The discussion in the previous two paragraphs highlights the theories concerning wealth-transfers and creation of financial synergies. Financial synergies can arise from: (1) reduction of default risk (and thus borrowing costs) by joining together firms with imperfectly correlated cash flow streams, (2) diversification of equity

risk for stockholders, or (3) contrasting efficiencies created by allowing managers to reduce their employment risk by creating larger, less risky firms. If net wealth is created in mergers by the capture of operating and/or financial synergies, there should be an increase in the summed market value of the combined firm's securities. And most or all of this net synergistic gain should accrue to stockholders, the firm's residual claimants.

Ravenscraft and Scherer (1987), Bhagat et al. (1990), and Kaplan and Weisbach (1992) generally predict that operating synergies will be created only in mergers between firms in the same or related industries. Meanwhile, Healey et al. (1992) shows particularly strong performance improvements for mergers involving firms with overlapping businesses. Models predicting the creation of financial synergies, such as those presented in Levy and Sarnat (1970), Lewellen (1971), Amihud and Lev (1981), and Amihud et al. (1986), almost invariably assume that these synergies are found only in conglomerate mergers, or mergers between firms in different industries. According to Higgins and Schall (1975), a conglomerate merger is defined as one that produces no benefits or diseconomies from changes in methods of producing the firm's goods and services. Because conglomerate mergers, in general, neither reduce competition nor provide operating economies of scale, it is often assumed that these mergers do not yield any operating synergies or create product or factor market power. Yet they can increase a firm's debt capacity or create other types of financial benefits.

In contrast to synergistic wealth creation, wealth redistributions are usually expected to occur when a merger merely changes the relative riskiness of

the cash flow streams of two or more securities. The theoretical models of Higgins and Schall (1975) and Galai and Masulis (1976) suggest that conglomerate mergers will lower equity values and raise bond values, leaving total firm value unchanged. Shastri (1990) shows that these mergers can have many different effects, such as wealth redistributions from stockholders to bondholders (or vice versa) or within security holder classes depending upon the covariance between the returns of the merging firms. Although most prior theoretical models of the financial effects of mergers suggest that these effects would be observed in conglomerate mergers, there is also no reason that financial synergies could not be found in mergers between firms in the same or related industries. It is possible that the covariance of returns is likely to be higher in similar-industry combinations and thus the opportunity for financial synergies is presumed to be lower.

In summation, there are three theoretical types of effects of mergers and acquisitions on the wealth of the bondholders:

1. A synergy effect where bondholders share some of the synergy with shareholders (if synergy exists).
2. A coinsurance effect where bondholders benefit because the firm's risk decreases due to imperfect correlation between cash flows of acquirer and target firms.
3. An incentive effect where bondholders lose because shareholders (as represented by management) have incentives to expropriate the wealth of

bondholders by raising the firm's risk through increases either in operating risk or in leverage.

3.3. CHANGES IN THE FIRM-LEVEL CHARACTERISTICS DUE TO THE SPIN-OFF AND THE POTENTIAL EFFECTS ON THE FIRM'S EXISTING BONDHOLDERS

Based on the theoretical models described in chapter 2 and the discussion of the potential effects of spin-offs and mergers and acquisitions on bondholders in sections 3.1. and 3.2., it is an empirical question whether spin-offs have any effect on the wealth of bondholders and if so, then the degree of the magnitude of these effects must be determined. The various reasons why bondholders may be affected negatively by a spin-off or a merger are discussed above. The following discussion provides the reasons as to how and when bondholders gain by a spin-off or a merger, and develops the parameters of a comprehensive model to study both negative as well as positive bondholders' wealth effects of spin-offs and mergers and acquisitions.

3.3.1. Potential benefits of spin-offs to bondholders

The wealth transfer from bondholders to shareholders is not the only possible bondholder wealth effect arising from a spin-off. Spin-offs may increase overall firm value by providing gains either from relaxation of regulatory or tax constraints (Schipper and Smith, 1983, Hite and Owers, 1983, from the undoing of an unwise takeover (Allen, Lummer, McConnell, and Reed, 1995), or from improved operating efficiency of the parent firm resulting from the decrease in the number and diversity of transactions under one management (Schipper and Smith,

1983, Hite and Owers, 1983, Daley, Mehrotra, and Sivakumar, 1997). The spin-off gains can also result from a maximization of managerial incentives. The spin-off of a division allows the managers of that division to have stock options and other incentives in a situation over which they have more direct control. Improved managerial motivation could then lead to improved performance of the subsidiary. Spin-offs can prove an effective redeployment tool boosting the parent profit and loss statement. This happens when these numbers are reviewed under accounting rules, which require a pro rata share of "controlled" subsidiary earnings to be included in the consolidated profit and loss statement of the parent. If certain tests are met, "control" is present even if the ownership is only 10%. The parent can thus spin-off up to 90% while still maintaining the benefit of control ownership.

Spin-off gains due to improved economic efficiency or the removal of negative synergies would prove to be beneficial to all stakeholders. If as a result of the spin-off the profitability of the firm improves, then from the bondholders' viewpoint there is a decrease in the probability that the parent firm would default on any payments (interest and principal) due to bondholders. The risk of bondholders' investments in the parent firm decreases. Therefore, one might expect returns on the outstanding bonds of the parent firm to exhibit a positive response to a spin-off in which the post spin-off operational efficiency of the parent improves.

3.3.2. Capital structure changes

According to the information content motivation for spin-offs, if spin-offs improve firm value for the parent and the subsidiary by conveying information that is otherwise not available to investors, then both bondholders and shareholders should benefit. If the firms issue new equity post-spin-off, then the bondholders should also benefit by the increase in the equity underlying their asset claims. However, the benefit to the bondholders will depend on 1) the distribution of debt between the parent and the subsidiary and 2) whether new equity is issued by the entity bearing the higher proportion of the debt (i.e., the proportional distribution of the equity and debt post-spin-off). Thus the effect of the spin-offs on the wealth of the shareholders and the bondholders of the parent (subsidiary) will be determined by the tradeoff between the asset reallocation and the improvement in the equity base as a result of the spin-off.

Krishnaswami and Subramaniam (1999) provide evidence on the capital raising activities of a sample of spin-off firms for up to three years before and three years after the completion of a spin-off. They find that in each of the three years before a spin-off, the frequency of issuance for the sample firms is statistically indistinguishable from that of their size and industry-matched control firms. However, in the first two years following spin-offs, the firms that engage in spin-offs issue equity more frequently than firms that do not engage in spin-offs. Also among firms that engage in spin-offs, the frequency of equity issuance increases following a spin-off. For the sample firms, in the two years after a spin-off, they find a total of 30 equity issues compared to only 20 in the two years

before the spin-off, the difference being significant at the 10% level. Firms that divest through spin-offs raise more amounts of equity and debt in dollar terms than their size and industry-matched control firms. For instance, in the second year following spin-off completion, the sample firms raise on average about $7 million more in equity and about $247 million more in debt than their size and industry matched control firms (difference significant at the 10% level). More importantly, the spin-off firms raise more capital following a spin-off compared to before the spin-off. In the two years following a spin-off, the mean debt (equity) raised is about $236 million ($25 million) higher than the mean debt (equity) raised in the two years before the spin-off. The difference in debt (equity) amounts is significant at the 10% (5%) level of significance. These results suggest that firms that engage in spin-offs raise more external capital following the spin-offs. Moreover, in each of the three years before a spin-off they find that sample firms issue significantly more debt than their size and industry matched counterparts.

As explained above, the new capital, debt or equity, raised by firms that have a spin-off can have negative or positive implications for the bondholders depending on the proportion of debt to assets distribution between the parent and the subsidiary. Also, if the parent firms spin-off the subsidiary with the intention of raising new debt, possibly because they can improve their debt-equity ratios by either a) transferring a higher proportion of debt to assets to the subsidiary or b) divesting a division with higher business risks to lower the parent firm's business risk for issuing new debt. In such a case the original debtholders stand to lose

because of the spin-off. Therefore, keeping all else constant, if the spin-off leaves the parent firm with a lower debt-to-asset ratio as compared to that in the pre-spin-off period, then the bondholders of the parent firm should experience a positive response to the spin-off.

The effects of the capital structure changes on the distribution of wealth also depend on characteristics of the parent-subsidiary pair. Dittmar (2000) finds that firms consider the costs and benefits of debt to the parent when determining the capital structure of the subsidiary, and the parents' collateral values impact the allocation of debt to the subsidiaries. The subsidiaries in her sample have leverage ratios that are significantly lower than pre-spin-off leverage ratios, indicating that debt is not allocated proportionally to value. The leverage ratio of the parent may depend on characteristics of the subsidiary if the pre-spin-off firm allocates debt as a means to attempt to expropriate wealth from the debtholders. The pre-spin-off firm allocates more debt to the parent if it is large and the subsidiary is small. The subsidiary and parent size influence the allocation of debt to the parent. Therefore the relative size of the subsidiary to the parent is used as a moderator in studying the changes in the capital structure of the parent firm in the model.

Moreover, Stark et al. (1994) suggest that restructurings through spin-offs require a better capitalized ongoing business than that allowed by a leveraged buyout. This leads to the thought that the pre-spin-off capital structure of the parent firm could become an important criterion in developing a model for the wealth effects of spin-offs.

3.3.3. Focus vs. non-focus

Desai and Jain (1999) note that the performance of focus-increasing spin-offs is significantly different than the non-focus-increasing sample. While the focus-increasing firms continue to earn large positive abnormal returns following spin-offs, the abnormal returns of the non-focus-increasing firms are negative. In particular, the abnormal returns (based on size and industry-matched control firms) for the focus-increasing sample are 11.12%, 20.77%, and 33.36% over holding periods of one, two, and three years following spin-offs. The corresponding abnormal returns for the non-focus-increasing sample are –0.96%, –7.66%, and –14.34%. The results are similar when the parents and the subsidiaries are examined separately. Also the results are not driven by the firms that were taken over following spin-offs. This latter result is important because of the Cusatis, Miles, and Woolridge (1993) hypothesis that spin-off gains occur because of the potential of mergers of either the parent or the subsidiary in the period following the spin-off.

Desai and Jain (1999) also find that the operating performance of the firms (parents and the corresponding subsidiaries) undertaking focus-increasing spin-offs improves in the post-spin-off period, while the non-focus increasing spin-offs exhibit negative (or close to zero) operating cash flow returns. Moreover, cross-sectionally three-day and one-year abnormal returns are positively associated with change in focus and change in operating performance. Unlike non-focus-increasing spin-offs, the focus-increasing spin-offs are associated with an increase in operating performance from the three year pre- to post-spin-off period. A

focus-increasing spin-off reduces the diversity of assets under management, thereby increasing the efficiency of the managers. This improved operating efficiency could result in value creation for all the stakeholders of the firm, including the bondholders and the shareholders. This suggests that the nature of wealth distribution in a spin-off could be affected by the focus-increasing/non-focus-increasing nature of the distribution of the assets.

Also the motivation behind a focus-increasing spin-off might be different than one behind a non-focus-increasing spin-off. Desai and Jain (1999) show that non-focus-increasing spin-offs are likely to be motivated by prior years' poor performance and a high level of financial leverage. In the pre-spin-off period of years –1 to –3, the mean (median) financial leverage of the non-focus-increasing spin-off firms is 15.08% (10.23%) higher (statistically significant) than the benchmark. In the post-spin-off period, the median shows that the level of debt has been reduced considerably. The median level is only 1.42% (though the mean of 13.93% is still on the higher side). They find some evidence that the non-focus-increasing spin-offs could be motivated by a high level of financial leverage prior to the spin-off, even though they do not offer any explanation as to how do the parents bring about the post-spin-off reduction in debt levels. They find that the post-spin-off median size- and industry-adjusted debt level for the parents and the subsidiaries separately is 1.48% and 5.75% respectively in a non-focus-increasing spin-off. Since they look at the industry-adjusted levels of debt in the pre- and post-spin-off years, a stronger test of any transfer of debt from the parent to the

subsidiary would be to look at the changes in the level across the pre- and post-spin-off years.

These differences among the performance of focus-increasing and non-focus-increasing spin-offs suggest that a sample of spin-offs would differ in the wealth distribution effects across these two subsamples. Therefore, bond returns of the parent firms' outstanding bonds should be positive for a spin-off that improves focus of the parent firm. Bond returns should be negative in a non-focus-increasing spin-off.

The wealth distribution in spin-offs might also be moderated by some additional factors. Slovin et al. (1995) show that rivals of subsidiary firms that are spun-off have a significantly positive two-day excess return of 0.60% around the announcement day. Rivals of parent firms are not affected by the announcement. They note that if changes in corporate governance lead to an enhanced competitive position of the spun-off subsidiary and the parent firm as a result of improvement in economic efficiency, then share prices of rival firms of both the affected subsidiary and the parent firm should fall on announcement of the restructuring. The positive excess returns for rivals of subsidiaries, however, do not support the economic efficiency argument. Instead, the results support the view that this type of restructuring decision signals favorable information about the unit that has industry-common elements. However they do not provide any theoretical explanation of the nature of these industry-common elements. The implication for any model studying the distribution of wealth in spin-offs is to

include a control for industry while measuring any change in efficiency of the firms involved in the spin-off.

Stark et al. (1994) believe that reports of heightened bondholder activism, in the wake of the Marriott spin-off, have led to greater attentiveness to bondholder concerns in a spin-off, examples being American Express Company's spin-off of Lehman Brothers and Ryder System, Inc.'s spin-off of Aviall, Inc., both of which occurred in 1994. This suggests that the sample of spin-off firms pre-Marriott might have differences in wealth sharing than those observed in spin-offs post-Marriott (October 1992 to October 1993).

In the light of these findings, it would be useful to investigate how the behavior of firms vary with respect to their motivations (focus-increasing/non-focus-increasing), and the relationship between profitability, new capital raised and motivations of the firms undertaking the spin-offs. A better understanding of the true motivations of the firms behind the spin-offs will lead to a much richer model of the distribution of wealth in spin-offs between shareholders and bondholders.

3.4. CHANGES IN THE FIRM-LEVEL CHARACTERISTICS DUE TO THE MERGER/ACQUISITION AND THE POTENTIAL EFFECTS ON THE FIRM'S EXISTING BONDHOLDERS

The combined Option Pricing Model and Capital Asset Pricing Model applied to pricing of securities in mergers suggest that the difference between the post- and pre-merger values of the outstanding securities (common stock and

bonds) of the acquirer firm is made up of the following main components: the variance effect, the leverage effect, and the synergy effect.

The variance effect: Since bond prices are a decreasing function of variance, bondholders will be worse off if the risk of the firm increases. If the acquirer had a lower (higher) variance than the combined firm, then all else being equal, there will be a decrease (increase) in the existing bonds of the acquirer as a result of the combination.

The leverage effect: A change in the firm's bankruptcy risk caused by a ceteris paribus change in the leverage ratio (defined as the ratio of face value of debt to firm value) will change the value of the firm's outstanding bonds. If the leverage ratio of the acquiring firm after the acquisition is lower than its pre-merger value, then the merger results in a decrease in the leverage-ratio-related risk for the outstanding bonds of the acquirer, thereby increasing their value.

The synergy effect: Any improvements in the operations of the firm as a result of the merger or acquisition would improve the ability of the firm to service its debt, thereby reducing the bankruptcy risk. Therefore bondholders could potentially benefit from any synergy gains.

3.5. THE MODEL

In an efficient securities market, if a restructuring is expected to change certain characteristics of the parent firm, then bondholders anticipating these changes, must react to the restructuring event. Based on the above arguments, the

following are the potential effects of a restructuring through spin-offs or through a mergers/acquisition on bondholders of the parent firm:

Increase in leverage: If the leverage of the parent or acquirer firm, as measured by the leverage ratio (total debt outstanding divided by total assets) or by the cash-flow coverage ratio (the ratio of cash flow from operations to interest expenses), increases as a result of the restructuring event, then bondholders would be expected to face a loss in wealth.

Increase in riskiness: Post spin-off or merger/acquisition, if the variance of the parent or acquirer firm's cash flows increases, then as the writers of a put option the bondholders would be expected to experience a decline in the value of their claims.

Increase in overall value: If the operational efficiency of the parent firm (as measured by the ratios of earnings before interest, taxes, and depreciation to sales, book, and market value of assets) improves, then any potential bondholder losses would be mitigated or possibly even turned into gains.

The effects of a restructuring on the wealth of the existing bondholders of the parent or acquiring firms can be tested by the following model:

Change in bondholder wealth = f(Pre-restructuring leverage, Post- restructuring change in leverage, Post-restructuring change in variability of cash flows, Post-restructuring operating performance, focus-increasing or non-focus-increasing restructuring, size of the spun-off (target) firm vis-à-vis the parent (acquirer), the proportion of debt to assets allocated to the subsidiary(target)).

Chapter 4: Data

4.1. SAMPLE DESCRIPTION

4.1.1. Spin-off sample

To identify the initial sample, the daily tapes of the Center for Research in Security Prices (CRSP) were searched from 1980 to mid-1998 for spin-offs completed by firms listed on the New York Stock Exchange (NYSE), American Stock Exchange (AMEX), and NASDAQ. CRSP identifies nontaxable spin-offs with a distribution code of 3763. However, this code also applies to new issues of another class of shares by the same firms. All such cases that were not bona fide spin-offs are excluded. Publications such as the *Moody's Dividend Records*, *Mergers and Acquisitions*, *Wall Street Journal* as well as the online libraries of *Lexis-Nexis* were searched to screen the initial sample.

The CRSP tapes listed 257 spin-offs completed between 1980 and April 30, 1998. Of these 26 firms were eliminated as new issues of another class of shares. This initial sample was further supplemented by spin-offs listed in the *Security Data Company's (SDC) Worldwide Acquisitions database.*[4] The final sample consists of 289 spin-offs announced and completed between 1979 and April 30, 1998. Table 1 lists the sample by the year of announcement and ex-dividend dates. The sample observations are well-dispersed throughout the sample period.

[4] I would like to thank Amy Dittmar for sharing the sample of spin-offs announced between 1983 and 1995, used in Dittmar (2000).

4.1.1.1. Identification of dates

The spin-off process follows a sequence of events highlighting several dates on which potentially important information is revealed to the markets. The first of these is the announcement date, which is the day on which the parent firm announces that it is considering a spin-off of part of its operations. Next, the firm works out the specifics of the spin-off and applies to the Internal Revenue Service for a ruling to determine if the distribution will be considered tax-free. Subsequently, the spin-off must be approved by vote of the board of directors and/or the shareholders. Occasionally, approval is required by state or federal regulatory authorities such as a public utility commission, the Federal Power Commission, the Interstate Commerce Commission, state bank examiners, etc. The board of directors must declare the spin-off dividend and set the date of record and payment date and the exchange must set an ex-dividend date, after which the spun-off subsidiary is no longer a part of the parent firm. Thus the announcement date marks the beginning of the spin-off process, while the ex-dividend date marks its culmination.

The CRSP daily tapes provide the ex-dividend date. To identify the announcement date, the *Wall Street Journal Index* and the *Wall Street Journal*, as well as all the major newspapers and trade journals listed in the Lexis-Nexis Library were searched extensively for any news item relating to spin-offs. The ex-dividend date was identified as a tentative press date, and all the data sources were checked for the current year and five previous years for an earlier report. If an earlier report was found, then the tentative press date was replaced and the

sources were checked for five more previous years. The earliest press date was finalized when there was found to be no previous mention in the current and the preceding five years. This earliest press date is then noted as the announcement date. For the sample of spin-offs announced and completed between 1979 and April 30, 1998, the average time between the announcement and the ex-dividend dates is six months.

4.1.2. Mergers and acquisition sample

The mergers and acquisition sample is identified as completed mergers in the *SDC Platinum Mergers and Acquisition database* during the period 1979 to April 30, 1998. The acquirer firms in this initial list are matched to the spin-off sample by year of announcement and industry of the parent firm involved in the spin-off. Table 1 describes the mergers and acquisition data set by announcement and ex-date year. The matched acquirer firms are then screened for having nonconvertible, publicly traded debt outstanding from at least six months prior to the merger announcement until at least six months after the effective date of the merger. In the final screening, only matched acquirer firms having trader-quoted bond data available are included in the final sample.

4.2. CORPORATE BOND DATA

The empirical evidence on the effects of corporate restructurings through spin-offs or mergers and acquisitions on bondholder wealth is quite mixed. In light of the potential bondholder-shareholder conflicts enumerated in the earlier chapters, it is surprising that earlier literature finds no significant bond price

reactions to these corporate restructurings. In fact, with respect to spin-offs, they were viewed as less efficient in the transfer of value to stockholders than leveraged buyouts and therefore not seriously perceived as event risk transactions during the 1980s (Schipper and Smith, 1984). Studies showing the reactions in the bond markets face the challenge of acquiring historical bond data in the highly fragmented dealer market for corporate bonds.

The market for listed corporate bonds is composed of two distinctly different segments including the exchange market and the over-the-counter market. Most bond trading is carried out in the dealer market where prices are proprietary. Publicly available data, such as that produced by bond trades on the NYSE, can be inadequate because these markets are extremely thin. In their study of the effects of leveraged buyouts on bondholders, Warga and Welch (1993) discuss the problem of availability of high-quality bond data and its impact on studies of bondholder wealth effects. Exchange prices may not accurately represent bond values in the dominant institutional markets. Using high-volume dealer market prices (instead of exchange prices or bond prices from commercial services) can show important differences in event studies. The authors find that dealer-market yields react sooner than exchange-based yields and can show statistically and economically more significant effects.

The two sources of generally available price quotes are exchange prices (e.g., New York or American Stock Exchanges) and institutional prices from major over-the-counter bond dealers (e.g., Merrill Lynch). Exchange prices reflect primarily the odd-lot activities of individual investors (ten bonds or less per

transaction) and cover only a limited number of corporate issues and a negligible portion of the total trading. Institutional data is more comprehensive than exchange data. It covers a larger number of bonds, representing prices at which large positions could have been or were actually transacted. Most studies that use institutional prices use data from the Merrill Lynch Bond Price Service (often obtained indirectly through services such as Data Resources Incorporated or Bloomberg Financial Markets). These prices are not trader quotes but algorithmically determined "matrix" prices. The algorithms consist of rules that specify the addition of a fixed spread over either an actively traded benchmark issue of the same company, another company's issue with similar rating, maturity, and coupon, or a U.S. Treasury issue. Commercial bond pricing services, such as Standard & Poor's (S&P) and Moody's, use a mix of exchange and matrix prices. Because exchange transactions are rare, these services rely heavily on matrix prices.

Warga and Welch (1993) compare the results of event study on leveraged buyouts (LBOs) that use of exchange data to the results obtained by using trader quotes. Warga and Welch compare the LBO event-window results obtained by using trader-quoted return data with those obtained by Asquith and Wizman (1990) by using S&P Bond guide data, for a set of 36 bonds from 13 companies that are common across both the studies. The event window is identical for both studies. Asquith and Wizman (1990), in their study on corporate buyouts find that 46 bonds of companies involved in successful LBOs have a significant average risk-adjusted return of –3.2% in a fourth-month event window. In comparison,

Warga and Welch find that the S&P Bond Guide data produces a statistically significant risk-adjusted event-window drop of 3.83% only if RJR is included and if different bonds of a company are considered to be independent observations. When RJR is excluded from the sample or bonds of the same company are first properly aggregated (to one bond/firm), the average bond price only drops between 1.70% and 0.93% and becomes statistically insignificant. Furthermore, most of the risk-adjusted bond price drops are caused by increases in the risk-adjusted benchmark. Unadjusted S&P returns are at best statistically insignificantly negative and at worst statistically significant positive. In contrast, by using the trader quotes, the risk-adjusted return drops are considerably larger, ranging from 5.00% to 7.30%, and always statistically significant. Even unadjusted returns are always negative, ranging from –2.32% to –4.60%. Although, they are statistically significant only when all 36 bonds are included as independent observations.

Warga and Welch (1993) use in-house trader-quoted bid yields from Lehman Brothers. Trader-quoted bid prices represent commitments to purchase at least one hundred bonds (a round lot) and can coincide with an actual trade price if a trade occurred near the end of the day. Traders are not required to supply quotes if they have not made a trade recently. Since Lehman Brothers are a major trader of corporate bonds, this gives them a very comprehensive sample of bond prices for most firms that had a LBO during the period of their study. Their results document that bondholders experienced significant wealth losses in successful LBOs of the 1985 to1989 period. In their conclusion they observe that trader-

quoted data is preferable in research investigating corporate bond reactions to firm-specific events.

By using trader-quoted data from Lehman Brothers this study adds to the understanding of the reactions in the bond markets to restructurings. The use of trader quotes provides bond prices around the restructuring event that better reflect the response of investors in the bond markets to the changes in the parent/ acquirer firm. It is therefore possible for this study to analyze the wealth effects of corporate restructuring events on debtholders by using a more extensive sample of nonconvertible bonds and parent/acquirer pairs.

4.2.1. Bond returns data set

The Fixed Income Database (FID) from the University of Houston consists of month-end data on the individual bonds that comprise the Lehman Brothers Bond Indexes. This paper uses the version of FID covering the period from January 1, 1973 through February 28, 1998. In addition to reporting the month-end prices, yields and monthly returns, the database reports CUSIP, maturity, coupon, various call, put, and sinking fund information, and a business sector for each bond (e.g. industrial, utilities, or financial). Also reported are the monthly Moody's and Standard & Poor's (S&P) ratings for each bond. An initial sample of parent spin-off firms and the matched acquirer firms is identified as described below in chapters 4.2.1. and 4.2.2. This initial sample is further screened to include only those firms that have publicly traded, nonconvertible debt issues in the sample period and for which data is available in the historical

corporate bond database. This results in a sample of 45 spin-off parent firms with 149 bonds and 144 matched acquirer firms with 790 bonds.

The secondary market for corporate bonds is very illiquid compared to the stock market. Nunn, Hill, and Schneeweis (1986) and Warga (1991) discuss various implications of this illiquidity for researchers. The data set distinguishes between trader-quoted prices and matrix prices. Quote prices are bid prices established by Lehman traders. If a trader is unwilling to supply a bid price because the bond has not traded recently, a matrix price is computed using a proprietary algorithm. As demonstrated by Warga and Welch (1993), trader-quoted prices are more likely to reflect all available information than are matrix prices. Therefore the analysis in this study uses only trader-quoted prices. Moreover Sarig and Warga (1989) show that as the liquidity of a bond decreases, the quality of the recorded prices deteriorates. They suggest that users of bond data employ some heuristic filters to screen out questionable observations. Following their recommendations, this study uses a filter to eliminate bonds that do not have a consecutive time series of exclusively trader-quoted returns around the announcement period. This ensures that all bonds in the sample are highly liquid and the market response to the spin-off announcement is fully reflected in the bond prices. After screening through the above filters, the spin-off sample comprises 37 parent firms with 123 publicly traded nonconvertible bonds which have bond data available in the month of the spin-off announcement, while the matched acquirer firms sample includes 133 firms having 619 outstanding bonds.

Tables 2 and 3 lay out the various steps involved in the sampling procedure and enumerate the sample size at its various stages.

The sample size concurs with those used in other spin-off and merger and acquisition studies over similar time periods, as well with the sample size of studies using bond price data. Although the stringencies of the screening criteria limit the sample size, especially for the spin-off sample, it is felt that a sample with a series of trader quotes around the announcement period would provide more meaningful results than a larger sample with matrix prices. Table 4 gives the sample size of some comparable studies on spin-offs.

Chapter 5: Bond market reaction to the restructuring announcement

The first of the hypotheses to be tested is whether restructurings through spin-offs or mergers and acquisitions have any effect on the bondholders of the parent or acquirer firms. To test this hypothesis, the bond returns of the 123 bonds of the 37 parent firms of the spin-off sample and of the 619 bonds of the 133 matched acquirer firms are examined for a period of 12 months before and after the spin-off and merger announcement.

5.1. METHODOLOGY

The average length of time from announcement to ex-dividend date for the firms in the spin-off sample is six months, while for the matched merger and acquisition sample this period is around four months. Since information could be revealed to the markets over the entire period from the announcement date to the completion of the spin-off (Copeland, Lemgruber, and Mayers, 1987), an event window of six months is considered. Brown and Warner (1980) point out the choice of event dates is crucial. Asquith (1981) demonstrates that the merger date (ex-date) is not nearly as accurate as the announcement date in analyzing stock market reaction to mergers. Asquith shows that the time lag between the announcement date and the merger date (ex-date) varies widely from merger to merger. When the merger date is used for analysis, this variable time lag creates so much noise that even if there is a systematic movement in security prices,

statistical tests may not detect it. The month of the announcement date is treated as "month 0". Both raw and adjusted bond returns are examined. Most of the prior studies have examined only the raw returns. However to adjust the bond returns for contemporaneous market movements, it is essential to compare the raw returns with suitable benchmarks.

Financial researchers have used a wide variety of models to calculate abnormal bond returns such as mean-adjusted returns, market models, excess returns over U.S. government securities, bond indices (Handjinicolaou and Kalay, 1984; Harrison and Grudnitski, 1987; Walker, 1991, 1994; Dittmar, 2000). Since a spin-off might change the variance of a firm's cash flows, it is not prudent to assume that the beta of the firm is unaffected by the spin-off. Therefore risk-adjustment procedures for bonds that require calculating a parameter like beta are avoided. Moreover when employing monthly bond returns, calculating a beta is problematic because salient bond characteristics (e.g., maturity, variance) can change substantially over the number of periods necessary to use for parameter estimation.

A control portfolio approach is employed, where control bonds are matched on bond rating, maturity and industry sector. For each month two types of benchmark-indices series are constructed: 1) risk-and-maturity adjusted returns (risk-maturity adjusted) and 2) industry-and-maturity adjusted returns (industry-maturity adjusted). The risk-maturity adjusted benchmark would capture any systematic changes in yields of bonds of similar risk and maturity characteristics, while the industry-maturity adjusted benchmark would capture any industry

effects on the bond yields. For each bond, the return of an equivalent benchmark index is subtracted from the corresponding monthly raw return. The risk-maturity adjusted benchmark index is constructed from ten Lehman Brothers Corporate Bond indexes in the dimensions of risk and maturity. The ten Lehman Brothers Corporate Bond indexes contained all public fixed-rate nonconvertible domestic debt. The indexes were divided into AAA, AA, A, BBB, and BB bonds and within each ranking into a long-term index and an intermediate term index. The industry-maturity benchmark is constructed from six Lehman Brothers Corporate Bond indexes in the dimensions of corporate sectors and maturity. The corporate sectors rankings are industrial, utility, and finance. Each ranking is further divided into a long-term index and an intermediate term index.

FID gives the monthly total return for each bond as

$$R_{it} = [(P_e + A_e) - (P_b + A_b) + \text{coupon payment}] / MVb. \quad (17)$$

where R_{it} = Monthly total Return for bond i in month t,

P_b = beginning price,

P_e = ending price,

MVb = beginning market value,

Ab = beginning accrued interest, and

Ae = ending accrued interest.

The monthly abnormal return for bond i at month t is calculated as

$$ARit = Rit - Rpt \quad (18)$$

where R_{pt} is the monthly total return for the index.

Following the methodology in Barber and Lyon (1997), the cumulative abnormal return for τ periods is computed as

$$CAR_{it} = \sum_{t}^{t} AR_{it} \,. \tag{19}$$

To test the null hypothesis that the mean cumulative abnormal return is equal to zero for a sample of n firms, the parametric test statistic employed is:

$$t_{CAR} = \overline{CAR}it \;/(s\,(CAR_{it})/\sqrt{n}) \tag{20}$$

where $\overline{CAR}_{it}$ is the sample average and $s\,(CAR_{it})$ is the cross-sectional sample deviations of abnormal returns for the sample of n firms. Barber and Lyon (1997) report that for stock returns, if the sample is drawn randomly from a normal distribution, the test statistics follow a Student's t-distribution under the null hypothesis.

During the event period, a number of the firms in the sample have more than one bond outstanding. Since it is possible that bond returns from the same company could be highly correlated, the results are reported in two ways: 1) using all individual bonds separately, and 2) on a per firm basis by first aggregating across all bonds from the same company and then by analyzing across the cross-section of firms. These methods provide two extreme bounds on the significance of the reported results. Under the assumption that companies' bond returns are perfectly correlated (uncorrelated), the aggregated (individual) results provide valid inference.

5.2. RESULTS FOR SPIN-OFF SAMPLE

5.2.1. Bond returns and spin-offs

The risk-maturity-adjusted monthly abnormal returns are reported in Tables 5 and 6. Table 5 reports the results for all bonds, while Table 6 reports the result on a firm level. The risk-maturity-adjusted monthly abnormal return is significantly negative in the month of the announcement both at the all bond level and at the firm level. For all bonds, the monthly risk-maturity-adjusted abnormal return in the month of the announcement is –0.2642 that is significant at the 1% level. The 37 firms that have bond returns in announcement month exhibit a monthly risk-maturity-adjusted abnormal return of –0.2509, significant at the 1% level. The results in Tables 5 and 6 indicate that the announcement of the spin-off has a significant effect on the parent firm's bonds. This is further supported by the significant cumulative abnormal returns reported in Table 7.

Fig. 2 displays the distribution of the risk-maturity-adjusted monthly abnormal bond returns for all firms and bonds in the sample for 12 months around the spin-off announcement. For most months around the spin-off announcement, the average monthly abnormal return is negative.

The industry-maturity-adjusted monthly abnormal returns are significant around the announcement period. Table 8 reports the results for all bonds, while Table 9 reports the results on a firm level. Furthermore, the cumulative abnormal returns (industry-maturity adjusted) for various periods around the spin-off announcement reported in Table 10 are also significant.

This significant effect of the spin-off announcement is different from that reported in some prior studies. Schipper and Smith (1983) examine bond price reactions of the outstanding nonconvertible bonds for four firms (16 bonds) for which bond prices are reported in the *Wall Street Journal* on the day of the announcement and the day before the announcement. They report only the frequency of firms (bonds) that have a bond price increase or decrease in response to the announcement. The bond price decreases for two firms (8 nonconvertible bonds), while there is no change in bond price of one firm (2 nonconvertible bonds). For one firm, there is both an increase and a decrease in the prices of its outstanding nonconvertible bonds. They examine bond rating changes for convertible as well as nonconvertible bonds of the sample firms. They find that only two of the 19 bonds (one firm) experience a decline in bond rating the year after the spin-off announcement. Schipper and Smith interpret the low sample frequency of declines in bond prices and ratings associated with spin-off announcement not to be suggestive of a widespread reduction in bondholder collateral. Hite and Owers (1983) study the reactions of 15 nonconvertible bonds in their sample to the spin-off announcement by calculating excess returns for only a period of 10 days around the spin-off announcement using exchange prices. They collect senior security price data from the *Wall Street Journal* and *Compuserve Inc.* Hite and Owers report a mean cumulative prediction error of –0.002 (test-statistic –0.13) in the 10 days around the announcement. As noted in chapter 4.1.1. most of the bond trades take place in the over-the-counter markets, and exchange market data does not adequately reflect the immediate reactions in

the bond markets. With exchange data, even a ten-day window around the spin-off announcement might fail to capture the true reactions in the bond markets to the spin-off announcement. It is therefore not surprising that both these studies do not report any significant reaction in the bond markets to the spin-off announcement. In his study of the effect of the Marriott spin-off on the firm's bondholders, Parrino (1997) uses dealer bid prices and observes a significant decline in the prices of all of Marriott's fixed-income securities during the three days following the spin-off announcement. Moreover, because of the difference in time periods, it may not be possible to directly compare the results of this study to those of previous studies. The studies of Schipper and Smith (1983) and Hite and Owers (1983) analyze spin-offs announced primarily during the 1960s and 1970s, while this study examines spin-offs announced in the 1980s and 1990s.

The significant abnormal returns to bondholders of my study are consistent with those observed by Maxwell and Rao (2002). Using the FID bond data, they report significant mean abnormal bond returns of –0.878 at the firm level and –0.629 at the all-bond level respectively, in the month of the spin-off announcement for a sample of 80 spin-offs announced in the period between 1973 and 1997.

The results of my study therefore reject the null hypothesis that announcements of spin-offs have no effect on bond prices. The average effect is a loss in the market value of the existing bonds of the parent firm on the announcement of the spin-off.

Another important observation is that there exists cross-sectional variation in the reaction to the announcement. Nearly 41% (37%) of the firms (of all bonds) have a positive response to the announcement. This cross-sectional variation is further evident in Table 11 and Table 12. Both tables compare the statistics of the firms whose bonds exhibit an average positive response with those of firms whose bonds exhibit an average negative response for the two series of monthly abnormal returns, which are risk-maturity-adjusted and industry-maturity-adjusted respectively. When the sample is subdivided into two groups based on the sign of the abnormal returns, it is found that each of the two subgroups has statistically significant abnormal returns. The cumulative abnormal returns for each subgroup for different periods in the six months surrounding the announcement are observed to be significant.

The results of the test of differences in means of the two subgroups tested using Welch's approximation of Student t-distribution are also reported. The hypothesis that the means of the two subgroups are equal is significantly rejected for all the time periods.

To further investigate the cross-sectional variation in response of the outstanding bonds, at the individual bond level, I identify all the nonconvertible bonds of the spin-off sample firms that are included in the Lehman data (Fixed Income Database) and that were outstanding in the month of announcement. I then track each bond until the completion of the spin-off, to determine the number of bonds that disappeared between the spin-off announcement and its completion, defined as the "spin-off event period." For each bond the return on the risk-

maturity benchmark index was subtracted from the corresponding monthly raw return to calculate the abnormal announcement return. I then calculate average abnormal announcement return for the following subsamples:

1. Sample of the bonds that disappeared between the announcement month and the completion (ex-date) of each spin-off.
2. Paired sample of bonds that remained outstanding for the parent firms of the prior subsample.
3. Sample of all bonds that remained outstanding for the entire sample of parent firms.

I use t-statistics to test for the differences in the mean abnormal announcement return between the subsamples of bonds that disappeared and the bonds that remained outstanding during the spin-off event period. Table 13 gives the results of these tests. These results show that:

a. The average abnormal return in the month of announcement of all the bonds that disappear for the entire sample of parent firms is significantly positive;
b. The average announcement return of all bonds that did not disappear during the spin-off event period for the paired subsample of parent firms is significantly negative; and
c. The subsample of all bonds that remained outstanding for the entire sample of parent firms has a significantly negative average abnormal return in the month of announcement.

Two tests are performed to further test whether the abnormal returns for bonds that disappear are significantly different from the abnormal return for

outstanding bonds. The difference in means was tested for: a) the disappeared and outstanding bonds for the entire sample and b) the disappeared bonds and the outstanding bonds for the same parent firms, i.e., the paired sample.

The difference in means of the disappeared bonds and the outstanding bonds is found to be significant. The difference in mean abnormal return for the sample of disappeared bonds and the paired sample of outstanding bonds for the same parent firms is also significant. This implies that for the parent spin-off firms, bonds that disappear have significantly positive announcement returns, while the outstanding bonds of the same firm have a significantly negative average abnormal return.

The above results suggest that the bonds that disappeared have different characteristics than bonds that remain outstanding. One possible difference could be the covenant protection. The disappeared bonds could be protected by covenants that require that the bonds be redeemed in the event of a restructuring such as a spin-off. Though it is largely observed that covenants that directly restrict spin-offs are not common (Hite and Owers, 1983), the disappeared bonds could have been protected by "event-risk" covenants. As noted by Leland (1991), most event-risk covenants have the same broad structure which specifies that bondholders can sell their bonds back to the issuer at par if two designated events are triggered: (1) a major change in the issuing firm's capital structure and (2) a downgrading of the bond by the rating agencies from investment grade to speculate grade.

Of the ten bonds that disappeared in the spin-off event period, five bonds experience a downgrade in the months around the spin-off announcement for which the bonds remain outstanding. Four bonds exhibit no change in rating, while one bond has a rating upgrade.

Thus there is indirect evidence that the bonds that disappeared had better covenant protection as compared to bonds that remain outstanding during the entire spin-off event period.

5.2.2. Bond ratings and spin-offs

Bond-rating changes provide additional evidence of reactions in the bond markets to spin-off announcements. Since any adjustment of bond rating to reflect the expectations of the effects of a spin-off occur with a lag, the changes in the bond ratings for firms that are rated by S&P or Moody's is investigated for three different periods around the announcement month (i.e., -1 to +1 months, -1 to +6 months and -1 to +12 months). The results are reported in Table 14. It is seen that five firms experience an increase in ratings, while the bonds for 15 firms are downgraded during this period. There is no change in the ratings of 17 firms. The analysis at the bond level shows that 12 bonds experience an increase in their ratings while the ratings declined for 56 bonds.

Of the 123 non-convertible bonds that have trader quoted bond data available in the month of the spin-off announcement, 46 bonds exhibit positive abnormal return in the month of announcement, while 77 bonds exhibit negative announcement returns. The ratings of 56 bonds are downgraded, 12 bonds

experience an increase in their ratings, and 55 bonds have no change in their ratings in the 12 months following the spin-off. To test whether credit ratings of bonds with positive (negative) returns increase (decrease), the sample of spin-off bonds is divided into two subsamples: a) bonds with positive announcement returns, and b) bonds with negative announcement returns. The bond returns of each subsample are regressed on rating changes of the bonds within the subsample. The results of the regression show that there is no significant relationship between bond returns and rating changes. Similar results are obtained by regressing the bond returns for the entire sample on the rating changes.

Thus, there is no clear relationship between the announcement month bond returns and the rating changes of the bonds in the 12 months following the announcement. However, the cross-sectional variation in response to spin-offs, observed in the bond price reactions, is also evident in the changes in bond ratings. Bondholders of firms announcing spin-offs are affected in various ways by the restructuring of the firm. While the spin-off has a negative impact on the bondholders of some firms, for other firms in the sample the spin-off creates value for the bondholders.

The above observations on the behavior of the parent firms' bonds around the spin-off announcement indicate that the wealth of the existing bondholders of the parent firm is affected by the firm's decision to restructure its business units through a spin-off. Whether this effect is positive or negative is determined by certain firm-specific factors, which need to be further investigated.

5.3. RESULTS FOR MERGERS AND ACQUISITION SAMPLE

5.3.1. Bond returns and mergers

Tables 15 and 16 report the risk-maturity-adjusted monthly abnormal returns for all bonds and at the firm level respectively. For all bonds in the month of the announcement, the monthly risk-maturity-adjusted abnormal return is negative (-0.0186) though insignificant. However in the two months following the announcement, the excess return is significantly negative (-0.0799 and –0.0795). At the firm-level, the excess bond returns is observed to be negative until about six months following the announcement, even though it is not found to be significant. In the pre-announcement period, there are eight positive and four negative observations of abnormal monthly returns, while in the post-period there are eight negative and four positive observations.

Table 17 gives the cumulative abnormal returns (risk-maturity adjusted) for various periods around the spin-off announcement. For the entire sample of firms, the CAR is significantly negative (-0.244) for the period -3 to +3 months around the merger/acquisition announcement.

The industry-maturity adjusted monthly abnormal returns are reported for all bonds in Table 17 and at the firm level in Table 18. The results are similar to the results using the risk-maturity-adjusted benchmark. The cumulative abnormal returns (industry-maturity adjusted) for various periods around the spin-off announcement are given in Table 19. These are not found to be significant for any of the three windows around the announcement month.

Fig. 3 displays the distribution of the risk-maturity-adjusted monthly abnormal bond returns for all firms and bonds in the matched acquirer sample for twelve months around the merger announcement. In comparison to the distribution of the average monthly abnormal returns around the spin-off announcement, the returns for bondholders around the merger announcement exhibit no distinct pattern.

The insignificant returns to bondholders around the merger/acquisition announcement are consistent with the incentive effects of corporate mergers. In other words, corporate mergers produce a co-insurance effect and transfer wealth from stockholders to bondholders. However, if merging firms are shareholder-wealth-protecting firms, then they increase their use of leverage relative to the pre-merger financial leverage and as a consequence bondholders of merging firms do not earn any abnormal returns. This hypothesis of incentive effects is examined further in the chapter 8 by examining the change in leverage of the acquiring firm and its relationship with bondholder wealth changes.

Although the average monthly abnormal return is not significant, there exists cross-sectional variation in the reaction to the announcement. Nearly 47% (49%) of the firms (of all bonds) have a positive response to the announcement. Table 21 compares the statistics of the firms whose bonds exhibit an average positive response with those of firms whose bonds exhibit an average negative response. When the sample is subdivided into two groups based on the sign of the abnormal returns, it is found that each of the two subgroups has statistically significant abnormal returns. The subsample of firms whose bonds exhibit a

positive response, have abnormal returns ranging from 0.387 on announcement to a CAR of 1.764 in the window of 13 months around the announcement. All the abnormal returns are significant at the 1% level. For firms whose bonds exhibit a negative response, the comparable period abnormal returns range from –0.320 to –1.518, all of which are significant at the 1% level. The test of differences in means of the two subgroups tested using Welch's approximation of Student t-distribution significantly rejects the hypothesis in all time periods that the means of the two subgroups are equal.

The cross-sectional variation in the reaction to the announcement exhibited by the risk-maturity-adjusted abnormal returns is also observed in the industry-maturity-adjusted returns. Table 22 compares the statistics of the firms whose bonds exhibit an average positive response with those of firms whose bonds exhibit an average negative response.

5.3.2. Bond ratings and mergers

Changes in the bond ratings of the matched acquirer firms are examined between three different periods around the announcement month, i.e., -3 to +1 months, -3 to +6 months and -3 to +12 months. The results are reported in Table 22. It is seen that seven firms experience an increase in ratings, while the bonds for 14 firms are downgraded during this period. There is no change in the ratings of 112 firms. This further supports the observation of cross-sectional variation seen in the analysis of bond returns around the merger/acquisition announcement.

Chapter 6: Effects of the restructuring on the parent and acquirer firms

6.1. FIRM-LEVEL CHARACTERISTICS

To investigate the cross-sectional variation in the reaction in the bond markets to the restructuring announcements, the changes that the restructurings (spin-offs or mergers or acquisitions) bring about in the parent or acquirer firms are examined. The following firm-level characteristics could potentially be changed because of a restructuring:

Capital structure: Since the debt of the original firm is divided between the parent and the new entity formed as a result of the spin-off, the leverage of the parent could change as a result of the spin-off. In a merger or acquisition, the debt of the acquiring firm might increase or decrease from its pre-merger levels. Any change in the leverage of the acquiring firm will affect its outstanding debtholders.

Operational efficiency: Removal of negative synergies between the parent and the spun-off subsidiary as a result of the spin-off could lead to improved operating performance of the parent. The spin-off could also allow managers to focus better on the lines of business left with the parent firm, thereby resulting in an improvement in the parent firm's performance. Synergies created by the merger or acquisition would also improve operating performance for the acquirer and target firms involved. Operating efficiencies are believed by many prior researchers to be the prime driver behind value creation in intra-industry or non-conglomerate mergers. It follows therefore that the acquirer firms in non-

conglomerate mergers might have improved operating performance as a result of the merger.

Business risks: The cash flows of the original firm are a sum total of its earnings from the business lines of the parent and its subsidiaries. The spin-off separates the business lines of the parent and the subsidiary, thereby possibly changing the variability of the cash flows of the parent firm. Similarly, in a merger or acquisition two different entities in different lines of business could be brought together in a conglomerate merger. While in a nonconglomerate merger the new combined entity could have a greater dependency on a single industry. Either of these situations would change the business risks, thereby changing the variability of the cash flows of the acquirer firm.

6.2. SPIN-OFF PARENT FIRMS

The sample of parent spin-off and target firms is further screened for the availability of Compustat data for a two-year window around the year of the spin-off. Parent-subsidiary firm pairs that have Compustat data as well as bond returns in the month of announcement are used in the further analysis. Changes in the above-listed characteristics of the parent firm are examined for the 37 firms for which bond returns and Compustat data are available. Table 22 provides summary statistics of the descriptive variables that characterize the parent firms (Panel A) and their corresponding subsidiary firms (Panel B) used in the sample.

Size is measured in terms of the assets of the firm. The median firm pre-spin-off has assets of $9.3 billion and then spins off a $1.5 billion subsidiary.

Thus, the median firm spins off approximately 16% of its assets. There is a significant decrease in the average size of the parent firms post spin-off, while the sizes of the subsidiaries increase significantly post-spin-off. The mean size of the subsidiaries relative to the parent firms increase significantly from 22% pre-spin-off to 29% post-spin-off. Subsidiary firms are therefore allocated a greater share of the assets in the spin-off.

To test for changes in leverage, book- as well as market-leverage ratios are calculated. Book-leverage is calculated as the ratio of long-term debt and current liabilities to book value of assets. Market-leverage is defined as the ratio of long-term debt and current liabilities to the sum of the market value of equity and book value of debt. The mean book-leverage ratio of the parent firms decreases from 34% in the pre-spin-off period to 33% post spin-off. For the subsidiaries, the mean-book leverage ratio increases from 29% to 35%. In the light of the earlier observation that the asset base of the subsidiaries increases significantly post-spin-off, the increase in their book leverage would be brought about by an increase in the debt allocated to the subsidiaries in the spin-off. The average debt of the subsidiaries increases by $1.62 billion, while correspondingly the parent firms exhibit a statistically significant average decrease in their total debt by $2.3 billion.

The mean market-leverage ratio of the parent firms decreases from 39% pre-spin-off to 34% post-spin-off, the change being statistically significant. There is also a decrease in the market-leverage ratios of the subsidiaries. Figs. 4 and 5 display the change in capital structure and asset characteristics of the parent firm.

Change in operational efficiency is measured as the difference in the pre- and post-spin-off industry adjusted return on assets (ROA). ROA is calculated as ratio of earnings before interest, depreciation, and taxes to market value of assets and is adjusted for industry performance by subtracting the median ratio for all firms in the Compustat file with the same four-digit SIC code. The average parent firm exhibits a 2% decrease in the industry-adjusted return on assets in the year following the spin-off.

Total firm returns are not observable; therefore their returns' variances and covariances cannot be calculated directly. I use two surrogates for firm returns' variances to test for the impact of changes in business risks of the parent firm in the bond markets. These include changes in stock returns' variance and changes in ratings of the outstanding bonds of the parent firms. The methodology described in Cox and Rubinstein (1985) and Ohlson and Penman (1985) is used to calculate stock returns' variances using daily stock price data for the two six-month periods (-190 to -11 and +11 to +190 days) before and after the spin-off announcement. Of the 37 firms, nearly 51% (19 firms) exhibit an increase in the variance of their stock returns. The outstanding bonds of the parent firms are examined for any change in their ratings by S&P or Moody's in the period one-month prior to the spin-off announcement to one-year subsequent to the announcement. The ratings of the bonds of 15 parent firms (41%) decreases, while for 22 firms there is either an increase or no change in rating.

Change in focus of the parent firms is also measured. Following Desai and Jain (1999) a focus-increasing spin-off is defined as one when the two-digit SIC

code of the parent is different from the two-digit SIC code of the subsidiary. A similar classification using the two-digit SIC code is used by Walker (1994) and Scanlon, Trifts and Pettway (1989) in their studies of takeovers and acquisitions. Of the 37 parent firms in my sample, 20 firms exhibit an increase in focus as a result of the spin-off.

Motivated by the findings in Stark et al. (1994), a post-Marriott variable is used as a dummy variable to proxy for whether the spin-off occurred after the Marriott spin-off that had led to heightened bondholder activism. This checks for any temporal shifts in the bond market reactions to spin-offs following the Marriott spin-off.

6.3. ACQUIRER FIRMS

The firm-level characteristics of the acquirer firms are examined for any changes in capital structure, operating efficiencies and business risks. Compustat data and month 0 bond returns are available for 50 matched-acquirer target-firm pairs. Table 24 provides summary statistics of the sample. Panel A provides descriptive statistics for the matched acquirer firms. Panel B describes the characteristics of the corresponding target firms.

The mean pre-merger size of the acquirer firm is $34.37 billion, while the mean target firm has a pre-merger size of $13.49 billion. There is a significant post-merger increase in average size of the acquirer and target firms. Figs. 6 and 7 display the change in capital structure and asset characteristics of the matched acquirer firms.

Change in leverage is tested using book as well as market leverage ratios. The mean book-leverage ratio of the acquirer firms increases significantly from 24% in the pre-merger period to 26% post-merger. For the target firms, the mean book-leverage ratio increases significantly from 26% to 34%. The change in the mean market-leverage ratios of the acquirer firms as well as the target firms is not significant. The average debt of the acquirer increases significantly by $4.13 billion, while correspondingly the target firms experience a statistically significant average increase in their total debt by $3.65 billion. Since the debt of both the acquirer and the target firms increases significantly post merger, it indicates that firms increase their debt after a merger. The book-leverage increases significantly, while the increase in market leverage is insignificant. The insignificance of the increase in the market leverage could be driven by an increase in the equity values of the firms post-merger. Thus the observation seems to support the claim that mergers result in firms increasing their debt capacity.

Change in operational efficiency, as measured as the difference in the pre- and post-spin-off industry adjusted return on assets (ROA), of the average acquirer firm shows a significant 3.4% decrease in the year following the merger.

Change in S&P or Moody's ratings of the outstanding bonds of the acquirer firms is used as a proxy for changes in business risk. Rating changes are examined in the period one-month prior to the merger/acquisition announcement to one year subsequent to the announcement. The ratings of the bonds of six parent firms (12%) decreases. Two (4%) firms experience an increase in their ratings. The rating of 42 firms (84%) remains unchanged.

A variable defined as "Conglomerate" is used to study any differences in wealth effects across conglomerate and nonconglomerate mergers. Following Maquieira et al. (1998), a conglomerate merger is defined as one where the acquirer and the target firms have different two-digit SIC codes. For example, if the merging firms have the same primary line of business, the merger is classified as nonconglomerate and if the two firms have different primary lines the merger is classified as conglomerate. A similar classification using the two-digit SIC code is used by Walker (1994) and Scanlon, Trifts, and Pettway (1989) in their studies of takeovers and acquisitions. Of the 50 mergers studied, 44 mergers are classified as nonconglomerate while six are classified as conglomerate. Although there is no agreement on the definition of conglomerate versus nonconglomerate mergers, this classification is justifiable and a very similar technique (matching by two-digit SIC codes from CRSP) has been employed by other researchers, including Berger and Ofek (1995), Sicherman and Pettway (1987) and Smith (1990). Moreover, Megginson et al. (1997) show that over 85% of the post-1977 mergers in their sample that are classified as conglomerate (focus-decreasing) or non-conglomerate (focus-preserving or focus-increasing) using the SIC code/line of business screen would have been classified the same way using the more sophisticated revenue-based Herfindahl measure.

Chapter 7: Testing the relationship between bondholder wealth effects and changes in firm characteristics

7.1. PREDICTIONS

The theoretical model predicts that changes in each of these parent firm characteristics could influence the wealth effects of spin-offs on bondholders. The primary implications of the theoretical model are:

HI: Leverage effect. If the leverage of the parent increases post spin-off, then bondholders would be expected to face a loss in wealth. The incentive effect hypothesis predicts that stockholders will try to negate any positive wealth transfers to the bondholders as a result of the merger by increasing leverage. An increase in leverage may not be possible for some companies, however, because of prior covenants. In any case, if markets are informationally efficient a bondholder should be able to anticipate any future debt ratio changes and assess the effects on their bonds. Therefore, bondholder gains should be inversely related to post-merger leverage increase. On the other hand, if there is no incentive effect, one would expect to see the greatest gain for bondholders where the decrease in risk is the greatest (i.e., for more highly levered firms).

HII: Operational efficiency effect. If the operational efficiency of the parent firm improves because of the spin-off, then any potential bondholder losses would be mitigated or possibly even turned into gains. The synergy effect predicts that bondholders may some of the synergy with shareholders if synergy gains exist in a merger or acquisition.

HIII: Variance effect. Post spin-off the variance of the parent firm's rate of return could increase. Then, as the writers of a put option, the bondholders would be expected to experience a decline in the value of their claims.

The incentive effect could involve either post-merger increases in operating risk or post-merger increases in leverage. Therefore an increase in the post-merger variance should be inversely related to bondholder gains.

7.1.1. Correlations

To determine the relationships between bondholder wealth and the firm-level characteristics, the Pearson correlations between bondholder returns and the firm variables are analyzed. Table 26 presents the correlation matrix between the bondholder wealth change and change in parent firm characteristics due to a spin-off. Many variables show significant relationships. Change in bondholder wealth is found to be significantly related to pre-spin-off leverage of parent firms. The relationship between bondholder wealth and change in market leverage of the parent firm is significantly negative. Change in bondholder wealth is also found to be significantly related to the post-Marriott dummy variable. Though the correlations between change in bondholder wealth and change in ROA and change in rating are not significant, the direction of the relationships is as predicted. Interestingly, the interaction effect of change in parent firms' operating efficiency and change in variance is significantly negatively correlated to change in bondholder wealth.

The correlations between bondholder wealth changes and changes in firm characteristics for the matched-acquirer firms sample are also analyzed. Change

in bondholder wealth is found to be significantly related to variance as measured by rating changes, change in book leverage, change in ROA (both industry-adjusted and raw measures), post-merger market leverage, change in market leverage of the acquirer firm. The target firm's pre-merger debt, pre-merger market value, pre-merger market leverage, pre-merger size, change in (industry-adjusted and raw) ROA, change in interest coverage of target, ratio of acquirer to target post-merger book leverage, change in the ratio of target to acquire size and the conglomerate variable show significant correlation to change in bondholder wealth. Table 27 enumerates the coefficient correlations and their significance.

7.1.2. Individual component effects

Since the three components of changes in parent firm characteristics do not necessarily act in the same direction, the change in value of any security is determined by the relative magnitudes of each effect. Initially each one is considered separately, and individual models are tested to isolate the effect of each independent component on bondholder wealth.

The leverage effect is tested by the following model:

MODEL 1: EFFECTS OF LEVERAGE

Index-adjusted returns of the parent firm bonds in the month of announcement $= \alpha_1 + \beta_1$ (Change in leverage of parent firm)

The expected sign of β_1 is negative for the parent spin-off firm sample as well as for the matched-acquirer firms. Pre-spin-off market leverage of parent, Post-spin-

off leverage of the parent to the leverage of the subsidiary ratio and relative size of subsidiary to the parent are used as control variables in Model 1.

The operational efficiency effect is tested by the model:

MODEL 2: EFFECTS OF CHANGES IN OPERATIONAL EFFICIENCY

Index-adjusted returns of the parent firm bonds in the month of announcement = $\alpha_2 + \beta_2$ (Change in operational efficiency of parent firm)

Improvements in operational efficiency of the parent/acquirer firm should not affect the parent firm's bondholders adversely, even though the bondholders might not gain significantly from improved operational efficiency of the firm. From the bondholders' viewpoint, any increase in ROA improves the ability of the firm to make the promised payments (interest and principal value of debt) to the bondholders. β_2 is therefore expected to be found either not significant or significantly positive. Post-spin-off relative size of the subsidiary to the parent is used as a control variable. Prior researchers (Desai and Jain, 1999) show that the post-spin-off performance of focus-increasing spin-offs is significantly different than the non-focus-increasing sample. Change in focus is therefore used as a moderating variable in testing Model 2.

To test the variance effect, the following model is employed:

MODEL 3: EFFECTS OF CHANGES IN RISK

Index-adjusted returns of the parent firm bonds in the month of announcement = $\alpha_3 + \beta_3$ (Change in variance of the parent firm's rate of return)

The expected sign of β_3 is negative. Post-Marriott dummy is used as a control variable to check for any temporal shifts for the spin-off sample.

7.2. REGRESSION RESULTS

7.2.1. Spin-off sample

Tables 28, 29, 30 present the results of the individual regression analyses. Change in bondholder wealth is significantly negatively related to the change in leverage of the parent firm. The coefficient value implies that bondholders on average lose an additional 27 percentage points if the market leverage of the parent firm increases as a result of the spin-off.

The relationship between bondholder returns and change in operational efficiency of the parent firm is significantly positive when the interaction between change in operational efficiency and change in focus is included in Model 2. Interestingly, the coefficient on the Focus variable has a negative sign. Furthermore, the interaction variable Focus*ROA of parent is significantly and negatively related to bondholder returns. Section 7.3.1 discusses the implication of this result.

Change in risk of parent does not have a significant effect on bondholder returns. However, the sign of the coefficient is as predicted under hypothesis III.

To examine changes in abnormal bond returns over time, I partition the spin-off sample in a number of ways and examine the relationship between the abnormal bond returns and the corresponding dummies for temporal shifts. The Marriott spin-off was announced in October 1992 and completed in October 1993.

The final sample consists of spin-offs announced and completed between 1979 to April 30, 1998. To study changes in bond market reactions to spin-offs over time that may or may not be attributed to the heightened bondholder activism following the Marriott spin-off, I partition the spin-off sample in the following ways:

1. Spin-offs announced before October 1993 and spin-offs announced after October 1993 (including any announcements in October 1993);
2. Spin-offs announced before 1988, between 1989 and September 1993, and after October 1993;
3. Spin-offs announced between 1979 to 1990, between 1991 and 1995, and after January 1996 (including January 1996); and
4. Spin-offs announced before October 1993, between November 1993 and 1995, and after January 1996.

The relationship between the bond returns and the time-period dummies is examined separately for each partitioning of the sample. The results of the four regressions are given in Table 31. These results show that the relationship between bond returns and the temporal dummy is significant only when the sample is partitioned around the Marriott spin-off (i.e. when there is a dummy for after the announcement of the Marriott spin-off in October 1993). This indicates that following the Marriott spin-off there was a systemic change in reactions in the bond markets to announcement of spin-offs. The significant negative coefficient suggests that bondholders became more aware of the event risk that a spin-off can manifest. A restructuring through spin-off could potentially weaken

the claims of the parent firm's bondholders on the underlying assets of the original firm and thereby decrease bondholder wealth. This heightened bondholder awareness is one potential reason why bond market reactions to a spin-off are significantly negative (specifically for the spin-offs announced following the Marriott spin-off).

7.2.2. Matched-acquirer firms sample

Tables 32, 33, 34 present the results of the individual regression analysis. Change in bondholder wealth is significantly negatively related to change in leverage of the acquirer firm. The coefficient value implies that bondholders on an average lose an additional 25 percentage points if the post-merger market-(book-) leverage of the acquirer firm increases.

The relationship between bondholder returns and change in operational efficiency of the acquirer firm is significantly positive. The Conglomerate variable has a significant negative effect on bondholder wealth. These results imply that bondholders can gain more in non-conglomerate mergers than in conglomerate mergers.

Change in risk of parent has a significant negative effect on bondholder returns. If the credit rating of the acquirer firm decreases because of the merger announcement, the bondholder wealth decreases.

7.3. FULL-EFFECTS REGRESSION

The individual wealth effects are modulated by the presence or absence of one or more of the firm-level changes. Therefore, to test for interaction effects

among the various variables a full-effects regression model is tested which includes all the independent variables. Moreover, tests for incentive effects requires the joint test of the hypothesis that there is a coinsurance effect and that shareholder wealth-protecting firms tend to neutralize the alleged wealth transfer by increasing leverage after the restructuring. This joint hypothesis is tested as follows:

Index-adjusted returns of parent firm bonds in the month of announcement = $\alpha_4 + \beta_1$ (Changes in leverage of parent) + β_2 (Changes in operational efficiency of parent) + β_3 (Changes in variance of rate of return of parent) + β_4 (pre-spin-off parent leverage) + β_5 (Focus dummy) + β_6(post-spin-off relative size of subsidiary to parent) + β_7 (post-spin-off relative leverage of subsidiary to parent) + β_8 (post-Marriott dummy).

As in the individual components effects, the post-Marriott dummy is used to detect any time shift in the spin-off sample only.

7.3.1. Spin-off sample

Table 35 presents the results of the tests of the full-effects model. Bondholder returns are significantly related to the pre-spin-off leverage of the parent. The coefficient implies that holding all other factors constant, if the parent firm has a higher leverage pre-spin-off, then its bondholders lose 27% more than bondholders of parent firms having low market leverage. The coefficient on change in leverage of parent firm is negative and significant. This supports the

model's implications that if the parent firm leverage increases post-spin-off then its bondholders lose wealth.

The coefficient on change in return on assets is significantly positive. This provides evidence that bondholders gain in spin-offs in which the operating efficiency of the parent firm improves post-spin-off. Increase in focus of the parent is has an insignificant effect on bondholder wealth. However the coefficient on the interaction between increase in focus and change in return on assets of the parent is significantly negative. This indicates that gains to bondholder as a result of post-spin-off improvement in efficiency of the parent decrease if the focus of the parent improves as a result of the spin-off. One possible explanation for this significant effect is that focus-increasing spin-offs lead to improvement in operating performance of the parent. Yet, increased focus also tends to eliminate the coinsurance effect for corporate debt (Lewellen, 1971). Parent firms that have subsidiaries in unrelated lines of business lose the coinsurance effect when they separate their earnings streams from that of the subsidiary in a focus-increasing spin-off. The implication for the existing bondholders of the parent firm is that the risk of default increases, even though the economic efficiency of the parent firm improves in focus-increasing spin-offs.

Change in rating of parent firm is found to have no significant effect on bondholder wealth.

As is evident from the significant negative coefficient on the post-Marriott dummy, a temporal shift is noted in the reactions of bond market to

announcement of spin-offs. Bond returns are significantly negative for spin-offs following the Marriott spin-off.

7.3.2. Matched-acquirer firms sample

The full-effects model for the matched-acquirer firms is presented in Table 36. Bondholder returns are significantly related to the change in variance of the acquirer's rate of return. The coefficient implies that holding all other factors constant, a merger in which the acquirer firm rating decreases would lead to a 23% loss in wealth for the bondholders.

Interestingly, the effect of a change in the leverage of the acquirer firm, though significant in the analysis of the individual effects, is not significant in the full-effects model. The bondholder wealth effects are driven by the change in the business risks of the acquirer rather than by changes in leverage of the acquirer. This lends support to the "no incentive effects" hypothesis. There is a higher likelihood that the business risk of the acquirer firm would change in a conglomerate merger than in a non-conglomerate merger. Since the Conglomerate variable has a significant negative effect on bondholder wealth, I find additional support to the observation that changes in bondholder wealth are more a result of the changes in the business risk of the acquirer than incentive effects.

The coefficient on change in industry-adjusted return on assets is significantly positive. This provides evidence that bondholders share in the gains resulting from improvements in operating efficiency along with the shareholders. The significance of the Conglomerate variable in the individual effects model that analyzes the effect of changes in operating efficiency (Model 2) implies that

improvements in operating efficiency differ across the type of merger. A nonconglomerate merger exhibits a greater improvement in operating performance of the acquirer firm. The implication for the holders of the outstanding bonds of the acquirer firm is that they could expect more gains in nonconglomerate merger than in a conglomerate merger. The significant positive coefficient on the change in industry-adjusted ROA of the target firms implies that existing bondholders of acquirer firms share in the synergy resulting from the merger that leads to better overall operating performance.

7.4. COMPARING THE TWO TYPES OF RESTRUCTURINGS

Spin-offs and merger and acquisitions are two types of restructurings that can be considered as mirror images. In a spin-off, a company divides itself into two publicly traded segments. In a merger or an acquisition, two publicly traded firms combine to form a single public entity. Schall, 1972 shows that for the multiperiod case (with risky as well as riskless debt), with transaction costless capital markets, the value of any set of income streams received by investors (after corporate taxes) is the same regardless of how that set of streams is provided. That is, the total value of a set of streams to investors is the same regardless of how that set is combined or divided into the debt or equity of one or more firms. This proposition is known as the Value Additivity Principle (VAP). Value additivity implies that the value of two cash flows will be the sum of the values of the separate flows. Empirically, value additivity conflicts with the wealth-creating effects of corporate spin-offs and mergers or acquisitions. The

results of this study provide evidence that bondholder wealth effects are determined by different value drivers depending on the type of restructuring. While the leverage effect is the predominant determinant of bondholder wealth in spin-offs, change in business risks primarily influences the effect of mergers on bondholder wealth.

The effect of focus on bondholder wealth is quite similar across the two types of restructurings. Focus-increasing spin-offs lead to improvement in operating performance of the parent. However, increased focus also tends to eliminate the co-insurance effect for corporate debt. The implication for the existing bondholders of the parent firm is that the risk of default increases even though the economic efficiency of the parent firm improves in focus-increasing spin-offs.

In the case of mergers, focus-preserving mergers (i.e. nonconglomerate mergers) exhibit a greater improvement in operating performance of the acquirer firm as compared to conglomerate mergers. The implication for the holders of the outstanding bonds of the acquirer firm is that they could expect more gains in nonconglomerate merger than in a conglomerate merger.

7.5. COMPARING THE RESULTS WITH THE RESULTS OF A RECENT STUDY OF BONDHOLDER WEALTH EFFECTS OF SPIN-OFFS

As noted in section 3.3.2, the Maxwell and Rao (2002) study is one of the more recent studies to test the wealth expropriation hypothesis that claims stockholder gains on the announcement of a spin-off are due to a wealth transfer from bondholders to stockholders. There are some similarities between the

Maxwell and Rao paper and my dissertation. However, each study has its own distinct focus. The focus of my dissertation is to understand the wealth effects of spin-offs on bondholders in a broad framework, considering not just wealth-transfer effects but also wealth creation effects of spin-offs for bondholders. Besides spin-offs, I study wealth effects of bondholders in mergers and acquisition. Here, I develop a good understanding of the common determinants of bondholder wealth across the two types of transactions and identify any transaction-specific effects. The Maxwell and Rao paper focuses on examining a wealth transfer from bondholders to stockholders in a spin-off.

Similar to my analysis, Maxwell and Rao (2000) measure wealth effects of spin-offs announcement on bondholders, by measuring changes in bond returns in the month of announcement and also examining changes in ratings of outstanding bonds. They find that bondholders, on the average, have a statistically significant negative abnormal return of 0.88% during the month of the spin-off announcement. This is similar to the significant negative abnormal return of 0.25% observed in the announcement month for the outstanding nonconvertible bonds of parent spin-off firms in my sample.

The spin-off sample period in the Maxwell and Rao (2000) paper (i.e., 1976 to 1997) is very close to my sample period of 1979 to April 30, 1998. Both studies exclude spin-offs that are not completed (Maxwell and Rao, 2002, p.9). The average time between the announcement and the ex-dividend dates for my spin-off sample is six months, similar to the 5.63 months observed for the same event period by Maxwell and Rao. The final sample used by Maxwell and Rao

includes 80 firms having 311 individual bond issues. My final spin-off sample, after screening for firms having consecutive time series of exclusively trader-quoted returns in the month of announcement and for six months following the announcement, includes 37 parent firms having 123 nonconvertible bonds.

Both papers use the Fixed Income Database that provides institutional bond prices from major over-the-counter bond dealers, as well as return and ratings data for corporate bonds (collected by Lehman Brothers). I examine bond returns and rating changes of publicly traded nonconvertible debt of the parent firm that is outstanding at the time of the announcement. Maxwell and Rao (2000), however, examine all publicly traded debt of the spin-off firms, without any distinction between convertible and nonconvertible bonds. The results of Hite and Owers (1983) show that the reactions of convertible and nonconvertible debt differ. In their sample, the mean cumulative prediction error for straight bonds is 0.002 (test-statistic is 0.13); while for convertible bonds it is 0.034 (test-statistic is 6.18). Only the convertible bond returns are statistically significant. They examine the possibility that the option component of the convertible debt is the likely explanation for this result. They find that seven of 17 convertible issues in their sample could have been converted to common stock worth at least 90% of the value of the bond on day –2. On the average these bond issues gained 0.067 at the announcement and the corresponding common stock gained 0.081. Thus the convertible issues near the money accounted for most of the positive effect. In the light of these results, it is useful to examine convertible and nonconvertible debt separately to understand the wealth effects.

The Fixed Income Database provides trader-quotes for bonds when available or matrix prices. As demonstrated by Warga and Welch (1993), trader-quoted prices are more likely to reflect all available information than are matrix prices. Therefore the analysis in my study uses only trader-quoted prices. Moreover, Sarig and Warga (1989) show that as the liquidity of a bond decreases, the quality of the recorded prices deteriorates. They suggest that users of bond data can employ some heuristic filters to screen out questionable observations. Following their recommendations, I use a filter to eliminate bonds that do not have a consecutive time series of exclusively trader-quoted returns around the announcement period. This ensures that all bonds in the sample are highly liquid and the market response to the spin-off announcement is fully reflected in the bond prices. Maxwell and Rao (2002) do not seem to make any distinction between trader-quotes and matrix prices.

Maxwell and Rao (2002) examine bond price reactions only in the spin-off announcement month. My study tracks the bonds outstanding at the time of announcement, for 12 months before and 12 months after announcement, to examine any leaks of information or lagged reactions in the bond markets. Considering the infrequent trading and illiquidity in the bond markets, it helps to examine bond price changes over a period of time.

The above differences in sampling procedure explain the differences in the final sample of spin-off firms and bonds across the two studies. Besides examining the reactions in bond markets, both papers test for determinants of bondholder wealth in spin-offs. I find the leverage effect (i.e., change in leverage

of the parent firm post-spin-off) is the predominant determinant of bondholder wealth in spin-offs. I also find that bondholder returns are significantly related to the pre-spin-off leverage of the parent. The coefficient implies that, holding all other factors constant, if the parent firm has a higher leverage pre-spin-off then its bondholders lose 27% more than bondholders of parent firms having low market leverage. Consistent with this finding, Maxwell and Rao (2002) find that bondholder losses (stockholder gains) are significantly influenced by financial risk. They use high pre-spin-off leverage ratios of debt-to-equity and debt-to-market value of equity, and alternatively by low pre-spin-off bond ratings (non-investment grade) as measures of the degree of financial risk.

Maxwell and Rao (2002) do not find any difference in the returns to bondholders based on whether the spin-off is cross-industry versus same-industry, and therefore do not support the hypothesis that the loss of coinsurance effect to bondholders in a cross-industry spin-off could yield potentially higher wealth transfer effects to shareholders compared to same-industry spin-offs. This is similar to my finding that increase in focus of the parent has an insignificant effect on bondholder wealth. However, a further examination of the interaction between focus and change in operational efficiency reveals an interesting result. I find that the coefficient on the interaction between increase in focus and change in return on assets of the parent is significantly negative. This indicates that gains to bondholder as a result of post-spin-off improvement in efficiency of the parent decrease if the focus of the parent improves as a result of the spin-off. One possible explanation for this significant effect is that focus-increasing spin-offs

lead to improvement in operating performance of the parent. However increased focus also tends to eliminate the co-insurance effect for corporate debt. Parent firms that have subsidiaries in unrelated lines of business lose the co-insurance effect when they separate their earnings streams from that of the subsidiary in a focus-increasing spin-off. The implication for the existing bondholders of the parent firm is that the risk of default increases, even though the economic efficiency of the parent firm improves in focus-increasing spin-offs.

Maxwell and Rao (2002) also find loss of collateral to be another factor that influences bondholder returns. Loss of collateral is measured by size of the assets in the spin-off entity relative to the pre-spin-off firm. I examine the relationship between the relative size of the subsidiary to the parent post-spin-off and bondholder returns. I find the relationship to be negative though not significant.

The change in rating of the outstanding bonds is examined by both studies. Both studies show that there are more downgrades than upgrades in time periods of six to twelve months following the spin-offs. I find that change in rating of parent firm does not have a significant effect on bondholder wealth. However, the variable measuring the interaction effect of change in rating and change in operational efficiency of the parent firm is significantly related to bondholder returns. I interpret the significant negative coefficient of this interaction term to imply that the direct relationship between a decrease in rating (increase in risk) of a parent firm and a decrease in bondholder wealth weakens as operating performance increases.

Besides the above factors considered by Maxwell and Rao (2002), I analyze the effects on bondholder wealth of changes in operational efficiency and business risks of the parent firm as a result of the spin-off. The relationship between bondholder returns and change in operational efficiency of the parent firm is significantly positive. I find that change in business risk of parent (as measured by changes in stock returns' variance and changes in ratings of the outstanding bonds of the parent) does not have a significant effect on bondholder returns. Yet, the sign of the coefficient is as predicted. The interaction effect of change in operational efficiency and change in risk of the parent firm has a significant negative effect on bondholder returns.

Thus my dissertation and the Maxwell and Rao (2002) paper, both contribute significantly in understanding the wealth effects of spin-offs on bondholders of the parent firm.

Chapter 8: Conclusions and extensions

This study investigates the effects of restructurings through spin-offs as well as mergers and acquisitions on the firm and its debtholders. Changes in the firm characteristics including capital structure, business risks, and operating performance of the firm are analyzed. This dissertation develops a model that predicts the relationship between cross-sectional firm characteristics and the changes in wealth of the original bondholders of the acquirer/parent firms that have publicly traded outstanding nonconvertible debt at the time of the merger/acquisition and spin-off respectively. The model predicts three important wealth effects: leverage effect, operational efficiency effect, and variance effect.

The empirical analyses show the wealth effects of corporate restructurings through mergers and acquisitions as well as spin-offs on bondholders. Using trader quotes for the sample of parent spin-off firms and the matched-acquirer firms that have publicly traded nonconvertible debt, monthly bond returns are calculated in the announcement period. Risk-maturity-adjusted monthly abnormal returns are significantly negative in the month of the announcement both at the all bond level and at the firm level for the spin-off sample. For the matched acquirer firm sample, though the bond returns are insignificant in the month of the announcement, significant negative returns are observed in the three months before to two months following the merger. Moreover, there exists a sufficient cross-sectional variation in the reaction to the announcement in the samples for both types of restructurings.

To explain the cross-sectional variation in the reaction in the bond markets to the spin-off announcement, I examine changes in the parent and acquirer firm characteristics that result from the restructurings. This study finds evidence that restructurings affect both parent and acquirer firm characteristics. There is a significant change in total debt, size, and leverage. In spin-offs, the parent firms' size, total debt, and leverage significantly decrease. In mergers or acquisitions, the acquirer firm's size, total debt, and leverage exhibit a significant increase. Operating performance, as measured by the industry-adjusted ROA, of the matched-acquirer firms has a significant decrease in the year following the merger announcement. Regression models are tested to establish the relationship between changes in parent firm characteristics and bondholder returns. The evidence is supportive of the model's implications that if the parent firm's leverage increases post-spin-off, then its bondholders lose wealth. The operational efficiency effect is also significant. In particular, spin-offs that lead to improved performance of the parent firm exhibit positive announcement-period excess returns. Surprisingly, gains to bondholder as a result of post-spin-off improvement in efficiency of the parent decrease if the focus of the parent improves as a result of the spin-off. This is consistent with the view that for bondholders, elimination of the coinsurance effect dominates over any efficiency gains in focus-increasing spin-offs.

With respect to mergers and acquisitions, change in variance and change in operating efficiency of the acquirer (as well as the target firms) affect bondholder returns. The bondholder wealth effects are driven more by the change

in the business risks of the acquirer rather than by changes in leverage of the acquirer.

Though not the primary objective of this study, it also examines whether transactions that increase corporate focus create more value than transactions that decrease focus. It is found that the direct relationship between focus and bondholder wealth depends on the type of the transaction. In the case of spin-off, there is no significant direct relation. However, increased focus tends to modulate the effect of the change in variance as well as the change in operating efficiency of the parent. Though the economic efficiency of the parent firm improves in focus-increasing spin-offs, the risk of default also increases possibly due to the elimination of the co-insurance effect because of the separation of the cash flows of the parent from that of its subsidiary.

With respect to mergers and acquisitions, a focus-increasing or a focus-preserving merger (i.e., a nonconglomerate merger) exhibits a greater improvement in operating performance of the acquirer firm. The implication for the holders of the outstanding bonds of the acquirer firm is that they could expect more gains in nonconglomerate merger than in a conglomerate merger. The significant positive coefficient on the change in industry-adjusted ROA of the target firms implies that existing bondholders of acquirer firms share in the synergy resulting from the merger that leads to better overall operating performance.

It is clear that along with stockholders, bondholders are also affected when corporations choose to restructure their assets, business units, and capital

structures. The nature of restructuring determines the gains or losses that bondholders could anticipate as a result of the firm-level changes. This study contributes towards understanding the risks and benefits involved in investing in the debt of corporations.

Tables

Table 1

Sample characteristics of completed spin-offs and mergers and acquisitions by announcement date and ex-date.

This table reports the distribution by year of announcement and year of completion of the full sample of spin-offs and mergers/acquisitions announced and completed between 1979 and April 30, 1998. Spin-offs are identified from the CRSP tapes, the *Security Data Company's (SDC) Worldwide Acquisition* database, publications such as *Moody's Dividend Records*, *Mergers and Acquisitions*, and news wires and articles from *Lexis-Nexis* and the *Wall Street Journal.* Mergers/acquisitions are identified from the *SDC Platinum Mergers and Acquisitions* database. For the spin-offs sample, the average time between announcement and ex-date is six months. The corresponding period for the mergers and acquisition sample is four months.

YEAR	NUMBER OF COMPLETED SPIN-OFFS		NUMBER OF COMPLETED MERGERS/ACQUISITIONS BY U.S. FIRMS	
	BY ANNOUNCEMENT	BY EX-DATE	BY ANNOUNCEMENT	BY EX-DATE
1979	10		13	10
1980	9	15	40	9
1981	10	11	192	157
1982	11	11	194	191
1983	17	11	339	287
1984	13	17	485	459
1985	19	15	432	432
1986	19	15	597	587
1987	17	17	564	520
1988	20	22	678	676
1989	20	22	701	688
1990	17	17	419	483
1991	4	9	369	376
1992	24	13	469	434
1993	18	25	573	535
1994	23	20	738	642
1995	25	22	875	883
1996	2	15	1101	1091
1997	11	9	1490	1377
1998		3	572	561
TOTAL	289	289	10841	10398

Table 2

The sampling procedure for the spin-off sample.

This table lists the various steps in the sampling procedure used for identifying spin-offs announced and completed between 1979 and April 30, 1998. Spin-offs are from the *CRSP* tapes, the *SDC Worldwide Acquisition database,* publications such as *Moody's Dividend Records, Mergers and Acquisitions,* and news wires and articles from *Lexis-Nexis* and the *Wall Street Journal*. Column A describes the selection process. The number of firms and bonds having available data at each stage are enumerated. Trader quotes are identified from the monthly bond price data in the Fixed Income Database (FID). The final sample includes all parent firms and their outstanding nonconvertible bonds that have trader quotes available in and around the spin-off announcement month.

Column A	***No. of firms***	***No. of bonds***
Initial list of spin-offs from CRSP and *SDC database*	289	
Parent firms (bonds) having trader quoted bond data available	42	168
Parent firms (bonds) having trader quoted bond data available in the month of the spin-off announcement	37	123

Table 3

The sampling procedure for the mergers and acquisition sample.

This table lists the various steps in the sampling procedure used for all completed mergers and acquisitions identified in the *SDC Platinum Mergers and Acquisition database* for the period 1979 to April 30, 1998. Column A describes the selection process. The number of firms and bonds having available data at each stage are enumerated. Trader quotes are identified from the monthly bond price data in the Fixed Income Database (FID). The final sample includes all acquiring firms and their outstanding nonconvertible bonds that have trader quotes available in and around the merger/acquisition announcement month.

Column A	***No.of firms***	***No. of bonds***
Initial list of mergers and acquisitions from *SDC Platinum Mergers and Acquisition* database.	11,834	
Acquirer firms matched to the spin-off sample by year of announcement and industry of parent firm.	302	
Matched acquirer firms (bonds) having trader-quoted bond data available.	133	643
Matched acquirer firms (bonds) having trader-quoted bond data available in the month of the merger/acquisition announcement.	131	619

Table 4

A comparison of sample sizes of studies using corporate bond data.

AUTHOR (S)	PAPER	SAMPLE PERIOD	SAMPLE SIZE (NO. OF FIRMS)	
Dittmar, A.K. (2000)	Capital structure in corporate spin-offs	1983 - 1995	19	
Warga, A. and Welch, I., (1993)	Bondholder losses in leveraged buyouts	1985 - 1989	16	
Schipper, K. and Smith, A., (1983)	Effects of recontracting on shareholder wealth: the case of voluntary spin-offs	1963 - 1981	13	(a)
Hite, G.L. and Owers, J.E., (1983)	Security price reactions around corporate spin-off announcements	1962-1981	31	(b)
Maxwell, W.F. and Rao, R.P., (2002)	Do spin-offs expropriate wealth from bondholders?	1976-1997	80	(c)

(a): Sample includes firms having nonconvertible and/or convertible bonds.
(b): Sample comprise of firms having all types of senior securities, i.e., both bonds and preferred stocks of convertible and nonconvertible types.
(c): Sample includes all publicly traded debt of firms that announced a spin-off in the sample period. No distinction is made between convertible and nonconvertible bonds.

Table 5

Risk maturity-adjusted abnormal bond returns around the spin-off announcement for all bonds.

Abnormal returns for all the nonconvertible bonds of a sample of 37 firms that announced and completed a spin-off between 1979 to April 30, 1998. Spin-offs are identified from the *CRSP* tapes, the *Security Data Company's (SDC) Worldwide Acquisition* database, publications such as *Moody's Dividend Records, Mergers and Acquisitions*, and news wires and articles from *Lexis-Nexis* and the *Wall Street Journal* for the period 1979 to early 1998. All nonconvertible bonds of the parent firm that have trader quotes available in and around the spin-off announcement month are identified from the monthly bond price data in the Fixed Income Database (FID). Monthly total return is obtained from the Fixed Income Database for each event month. The announcement month is identified as month 0. A risk-maturity-adjusted benchmark index is constructed from ten Lehman Brothers Corporate Bond indexes in the dimension of risk and maturity. For each bond the return on the risk-maturity-benchmark index is subtracted from the corresponding monthly raw return in each event month to calculate the abnormal return. The significance of the mean is determined using a two-tail t-statistic. The last column of the table gives the proportion of bonds with positive abnormal returns. Binomial tests for whether this proportion is significantly different from 50% are also reported in the same column. ***,**,* indicate significance at the 1%, 5%, 10% level of confidence respectively for the Binomial tests.

Event Month	No. of firms	No. of bonds	Mean abnormal return %	t-statistic for mean abnormal return	% of bonds with positive abnormal returns
-12	33	105	0.1467	1.77	62.86% ***
-11	33	106	0.0198	0.22	55.66%
-10	33	109	-0.0271	-0.34	44.95%
-9	33	108	0.0016	0.02	50.93%
-8	33	110	-0.1400	-1.55	45.45%
-7	34	112	-0.0586	-0.61	47.32%
-6	35	110	-0.1908	-2.45	47.27%
-5	37	114	-0.0959	-1.32	42.98%
-4	37	117	-0.3214	-3.03	31.62% ***
-3	36	114	-0.1733	-1.77	45.61%
-2	37	120	-0.0488	-0.54	50.00%
-1	37	120	-0.1463	-1.42	41.67% *
0	37	123	-0.2642	-3.36	37.40% ***
1	35	121	-0.0600	-0.61	35.54% ***
2	35	121	-0.0341	-0.33	50.41%
3	35	127	-0.1961	-2.85	33.86% ***
4	34	127	0.1132	1.85	54.33%
5	35	130	-0.0197	-0.26	43.85%
6	34	119	-0.2833	-2.60	37.82%
7	34	119	0.0509	0.65	51.26%
8	34	120	0.0407	0.45	50.83%
9	33	116	-0.0078	-0.08	42.24% *
10	34	120	-0.0302	-0.38	45.00%
11	35	121	0.1107	1.35	57.85% *
12	35	120	-0.0734	-0.82	48.33%

Table 6

Risk maturity-adjusted abnormal bond returns around the spin-off announcement for one bond per firm.

Abnormal returns for all the nonconvertible bonds of a sample of 37 firms that announced and completed a spin-off between 1979 to April 30, 1998. Spin-offs are identified from the *CRSP* tapes, the *Security Data Company's (SDC) Worldwide Acquisition* database, publications such as *Moody's Dividend Records, Mergers and Acquisitions*, and news wires and articles from *Lexis-Nexis* and the *Wall Street Journal* for the period 1979 to early 1998. All nonconvertible bonds of the parent firm that have trader quotes available in and around the spin-off announcement month are identified from the monthly bond price data in the Fixed Income Database (FID). Monthly total return is obtained from the Fixed Income Database for each event month. The announcement is identified as month 0. A risk-maturity-adjusted benchmark index is constructed from ten Lehman Brothers Corporate Bond indexes in the dimensions of risk and maturity. For each bond the return on the risk-maturity-benchmark index is subtracted from corresponding monthly raw return in each event month to calculate the abnormal return. To calculate the abnormal returns on a per firm basis, values are first aggregated across all bonds for the same firm and then averaged across firms in each event month. The significance of the mean is determined using a two-tail t-statistic. The last column of the table gives the proportion of firms with positive abnormal returns. Binomial tests for whether this proportion is significantly different from 50% are also reported in the same column. ***,**,* indicate significance at the 1%, 5%, 10% level of confidence respectively for the Binomial tests.

Event Month	No. of bonds	No. of firms	Mean abnormal return %	t-statistic for mean abnormal return	% of firms with positive abnormal returns
-12	105	33	0.1291	0.96	51.52%
-11	106	33	-0.0966	-0.80	45.45%
-10	109	33	-0.0036	-0.03	42.42%
-9	108	33	-0.1755	-1.34	48.48%
-8	110	33	-0.3492	-2.42	33.33% **
-7	112	34	-0.0751	-0.57	41.18%
-6	110	35	-0.4018	-2.52	40.00%
-5	114	37	-0.1509	-1.13	40.54%
-4	117	37	-0.1658	-1.12	35.14% *
-3	114	36	-0.1678	-1.42	41.67%
-2	120	37	-0.0288	-0.19	45.95%
-1	120	37	-0.0853	-0.45	40.54%
0	123	37	-0.2509	-2.33	40.54%
1	121	35	0.0364	0.23	51.43%
2	121	35	-0.1714	-0.92	45.71%
3	127	35	-0.1215	-0.96	42.86%
4	127	34	0.0875	0.85	58.82%
5	130	35	-0.0944	-0.63	34.29% *
6	119	34	-0.2791	-1.70	38.24%
7	119	34	-0.0429	-0.33	47.06%
8	120	34	-0.1211	-1.14	50.00%
9	116	33	-0.1018	-0.60	36.36% *
10	120	34	-0.0069	-0.04	44.12%
11	121	35	0.0289	0.18	48.57%
12	120	35	-0.0667	-0.37	45.71%

Table 7

Risk-maturity-adjusted cumulative abnormal returns.

Cumulative abnormal returns (CAR) for all the nonconvertible bonds of a sample of 37 firms that announced and completed a spin-off between 1979 to April 30, 1998. Spin-offs are identified from the *CRSP* tapes, the *Security Data Company's (SDC) Worldwide Acquisition* database, publications such as *Moody's Dividend Records, Mergers and Acquisitions*, and news wires and articles from *Lexis-Nexis* and the *Wall Street Journal* for the period 1979 to early 1998. All nonconvertible bonds of the parent firm that have trader quotes available in and around the spin-off announcement month are identified from the monthly bond price data in the Fixed Income Database (FID). Monthly total return is obtained from the Fixed Income Database for each event month. The announcement is identified as month 0. A risk-maturity-adjusted benchmark index is constructed from ten Lehman Brothers Corporate Bond indexes in the dimension of risk and maturity. For each bond the return on the risk-maturity-benchmark index is subtracted from the corresponding monthly raw return in each event month to calculate the abnormal return. The abnormal returns are computed on a per firm basis, by first aggregating across all bonds for the same firm and then taking the average across firms in each event month. Cumulative abnormal returns are then calculated for three event windows, i.e., for three months, seven months, and 13 months, around the spin-off announcement month. The parametric test statistic of Barber and Lyon (1997) is used to test the significance of the mean cumulative abnormal return.

Period	CAR -1 to +1	CAR -1 to +6	CAR -6 to +6
Mean %	-0.320	-0.883	-1.983
t-statistic	-1.288	-1.863	-2.853
No. of firms	35	34	33

Table 8

Industry-maturity-adjusted abnormal bond returns around the spin-off announcement for all bonds.

Abnormal returns for all the nonconvertible bonds of a sample of 37 firms that announced and completed a spin-off between 1979 to April 30, 1998. Spin-offs are identified from the *CRSP* tapes, the *Security Data Company's (SDC) Worldwide Acquisition* database, publications such as *Moody's Dividend Records, Mergers and Acquisitions*, and news wires and articles from *Lexis-Nexis* and the *Wall Street Journal* for the period 1979 to early 1998. All nonconvertible bonds of the parent firm that have trader quotes available in and around the spin-off announcement month are identified from the monthly bond price data in the Fixed Income Database (FID). Monthly total return is obtained from the Fixed Income Database for each event month. The announcement month is identified as month 0. An industry-maturity-adjusted benchmark index is constructed from six Lehman Brothers Corporate Bond indexes in the dimensions of industry and maturity. For each bond the return on the industry-maturity-benchmark index is subtracted from the corresponding monthly raw return in each event month to calculate the abnormal return. The significance of the mean is determined using a two-tail t-statistic. The last column of the table gives the proportion of bonds with positive abnormal returns. Binomial tests for whether this proportion is significantly different from 50% are also reported in the same column. ***,**,* indicate significance at the 1%, 5%, 10% level of confidence respectively for the Binomial tests.

Event Month	No. of firms	No. of bonds	Mean abnormal return %	t-statistic for mean abnormal return	% of bonds with positive abnormal returns
-12	33	108	0.1341	1.57	62.04% ***
-11	33	109	-0.0077	-0.09	53.21%
-10	33	112	-0.0819	-0.99	42.86%
-9	33	111	-0.0814	-1.02	42.34% *
-8	33	113	-0.1818	-1.87	45.13%
-7	34	114	-0.0705	-0.78	47.37%
-6	35	112	-0.2014	-2.62	45.54%
-5	37	114	-0.0809	-1.12	45.61%
-4	37	117	-0.3433	-3.36	35.04% ***
-3	36	116	-0.2225	-2.31	43.10%
-2	37	123	-0.0842	-0.97	50.41%
-1	37	123	-0.2028	-1.85	37.40% ***
0	37	123	-0.2884	-3.66	37.39% ***
1	35	122	-0.0268	-0.27	43.44%
2	35	122	-0.0602	-0.58	50.82%
3	35	124	-0.1766	-2.40	41.94% *
4	34	124	0.0677	1.02	54.84%
5	35	126	-0.0720	-0.95	46.03%
6	34	112	-0.3200	-2.88	36.61% ***
7	34	114	0.0442	0.53	47.37%
8	34	113	-0.0013	-0.01	53.98%
9	33	109	-0.0842	-0.85	38.53% **
10	34	113	-0.0215	-0.25	45.13%
11	35	115	0.1300	1.57	61.74% ***
12	35	114	-0.0305	-0.36	45.61%

Table 9

Industry-maturity-adjusted abnormal bond returns around the spin-off announcement for one bond per firm.

Abnormal returns for all the nonconvertible bonds of a sample of 37 firms that announced and completed a spin-off between 1979 to April 30, 1998. Spin-offs are identified from the *CRSP* tapes, the *Security Data Company's (SDC) Worldwide Acquisition* database, publications such as *Moody's Dividend Records, Mergers and Acquisitions*, and news wires and articles from *Lexis-Nexis* and the *Wall Street Journal* for the period 1979 to early 1998. All nonconvertible bonds of the parent firm that have trader quotes available in and around the spin-off announcement month are identified from the monthly bond price data in the Fixed Income Database (FID). Monthly total return is obtained from the Fixed Income Database for each event month. The announcement is identified as month 0. An industry-maturity-adjusted benchmark index is constructed from six Lehman Brothers Corporate Bond indexes in the dimensions of industry and maturity. For each bond the return on the industry-maturity-benchmark index is subtracted from the corresponding monthly raw return in each event month to calculate the abnormal return. To calculate the abnormal returns on a per firm basis, values are first aggregated across all bonds for the same firm and then averaged across firms in each event month. The significance of the mean is determined using a two-tail t-statistic. The last column of the table gives the proportion of firms with positive abnormal returns. Binomial tests for whether this proportion is significantly different from 50% are also reported in the same column. ***,**,* indicate significance at the 1%, 5%, 10% level of confidence respectively for the Binomial tests.

Event Month	No. of bonds	No. of firms	Mean abnormal return %	t-statistic for mean abnormal return	% of firms with positive abnormal returns
-12	108	33	0.1909	1.46	51.52%
-11	109	33	-0.1223	-1.07	45.45%
-10	112	33	-0.0388	-0.27	42.42%
-9	111	33	-0.2105	-1.60	48.48%
-8	113	33	-0.2618	-1.87	33.33% **
-7	114	34	-0.0351	-0.30	41.18%
-6	112	35	-0.3872	-2.41	40.00%
-5	114	37	-0.1276	-0.97	40.54%
-4	117	37	-0.1829	-1.44	35.14% *
-3	116	36	-0.1531	-1.30	41.67%
-2	123	37	-0.0238	-0.17	45.95%
-1	123	37	-0.0355	-0.19	40.54%
0	123	37	-0.2479	-2.20	40.54%
1	122	35	0.0669	0.43	51.43%
2	122	35	-0.1255	-0.66	45.71%
3	124	35	-0.0537	-0.41	42.86%
4	124	34	0.0716	0.65	58.82%
5	126	35	-0.2341	-1.96	34.29% **
6	112	34	-0.2400	-1.61	38.24%
7	114	34	-0.0050	-0.04	47.06%
8	113	34	-0.0996	-1.00	50.00%
9	109	33	-0.0374	-0.20	36.36% *
10	113	34	0.1015	0.68	44.12%
11	115	35	0.0978	0.69	48.57%
12	114	35	0.0289	0.19	45.71%

Table 10

Industry-maturity-adjusted cumulative abnormal returns.

Cumulative abnormal returns (CAR) for all the nonconvertible bonds of a sample of 37 firms that announced and completed a spin-off between 1979 to April 30, 1998. Spin-offs are identified from the *CRSP* tapes, the *Security Data Company's (SDC) Worldwide Acquisition* database, publications such as *Moody's Dividend Records, Mergers and Acquisitions*, and news wires and articles from *Lexis- Nexis* and the *Wall Street Journal* for the period 1979 to early 1998. All nonconvertible bonds of the parent firm that have trader quotes available in and around the spin-off announcement month are Identified from the monthly bond price data in the Fixed Income Database (FID). Monthly total return is obtained from the Fixed Income Database for each event month. The announcement is Identified as month 0. An industry-maturity-adjusted benchmark index is constructed from six Lehman Brothers Corporate Bond indexes in the dimension of industry and maturity. For each bond the return on the industry-maturity-benchmark index is subtracted from the corresponding monthly raw return in each event month to calculate the abnormal return. The abnormal returns are computed on a per firm basis, by first aggregating across all bonds for the same firm and then taking the average across firms in each event month. Cumulative abnormal returns are then calculated for three event windows, i.e., for three months, seven months, and 13 months, around the spin-off announcement month. The parametric test statistic of Barber and Lyon (1997) is used to test the significance of the mean cumulative abnormal return.

Period	CAR -1 to +1	CAR -1 to +6	CAR -6 to +6
Mean %	-0.2223	-0.795	-1.781
t-statistic	-0.919	-1.990	-3.318
No. of firms	35	34	33

Table 11

Cross-sectional variation in the risk-adjusted monthly abnormal returns response to the spin-off.

Cumulative abnormal returns (CAR) for all the nonconvertible bonds of a sample of 37 firms that announced and completed a spin-off between 1979 to April 30, 1998. Spin-offs are identified from the *CRSP* tapes, the *Security Data Company's (SDC) Worldwide Acquisition* database, publications such as *Moody's Dividend Records, Mergers and Acquisitions*, and news wires and articles from *Lexis- Nexis* and the *Wall Street Journal* for the period 1979 to early 1998. All nonconvertible bonds of the parent firm that have trader quotes available in and around the spin-off announcement month are identified from the monthly bond price data in the Fixed Income Database (FID). Monthly total return is obtained from the Fixed Income Database for each event month. The announcement is identified as month 0. A risk-maturity-adjusted benchmark index is constructed from ten Lehman Brothers Corporate Bond indexes in the dimension of risk and maturity. For each bond the return on the risk-maturity-benchmark index is subtracted from the corresponding monthly raw return in each event month to calculate the abnormal return. The abnormal returns are computed on a per firm basis, by first aggregating across all bonds for the same firm and then taking the average across firms in each event month. Cumulative abnormal returns are then calculated for three event windows, i.e., for three months, seven months, and 13 months, around the spin-off announcement month. Panel A reports the abnormal returns for the group of firms that have a positive bond market response to the announcement in month 0. Panel B reports the abnormal returns for the group of firms having a negative bond market response to the announcement in month 0. Welch's approximation of Student t-distribution is used to test the differences in the means of the two groups.

Period	Month 0	CAR -1 to +1	CAR -1 to +6	CAR -6 to +6
Panel A: positive returns				
Mean %	0.315	0.865	1.079	0.857
t-statistic	5.657	3.120	4.414	3.933
No. of firms	15	15	14	11
Panel B: negative returns				
Mean %	-0.637	-1.208	-2.256	-3.402
t-statistic	-5.281	-5.210	-3.595	-3.794
No. of firms	22	20	20	22
Panel C : Differences in means				
t-statistic	7.167	5.736	4.952	4.615

Table 12

Cross sectional variation in the industry-maturity-adjusted monthly abnormal returns response to the spin-off.

Cumulative abnormal returns (CAR) for all the nonconvertible bonds of a sample of 37 firms that announced and completed a spin-off between 1979 to April 30, 1998. Spin-offs are identified from the *CRSP* tapes, the *Security Data Company's (SDC) Worldwide Acquisition* database, publications such as *Moody's Dividend Records, Mergers and Acquisitions*, and news wires and articles from *Lexis- Nexis* and the *Wall Street Journal* for the period 1979 to early 1998. All nonconvertible bonds of the parent firm that have trader quotes available in and around the spin-off announcement month are identified from the monthly bond price data in the Fixed Income Database (FID). Monthly total return is obtained from the Fixed Income Database for each event month. The announcement is identified as month 0. An industry-maturity-adjusted benchmark index is constructed from six Lehman Brothers Corporate Bond indexes in the dimension of risk and maturity. For each bond the return on the industry-maturity-benchmark index is subtracted from the corresponding monthly raw return in each event month to calculate the abnormal return. The abnormal returns are computed on a per firm basis, by first aggregating across all bonds for the same firm and then taking the average across firms in each event month. Cumulative abnormal returns are then calculated for three event windows, i.e., for three months, seven months, and 13 months, around the spin-off announcement month. Panel A reports the abnormal returns for the group of firms that have a positive bond market response to the announcement in month 0. Panel B reports the abnormal returns for the group of firms having a negative bond market response to the announcement in month 0. Welch's approximation of Student t-distribution is used to test the differences in the means of the two groups.

Period	Month 0	CAR -1 to +1	CAR -1 to +6	CAR -6 to +6
Panel A: positive returns				
Mean %	0.398	0.990	1.122	1.433
t-statistic	6.963	3.530	3.830	4.141
No. of firms	13	15	14	9
Panel B: negative returns				
Mean %	-0.598	-1.132	-2.137	-2.986
t-statistic	-4.941	-5.778	-4.777	-5.416
No. of firms	24	20	20	24
Panel C : Differences in means				
t-statistic	8.098	6.201	6.095	6.788

Table 13

Bond returns and covenant protection.

This Table provides evidence for the possible effect of covenant protection on the abnormal returns of all the nonconvertible bonds of a sample of 37 firms that announced a spin-off in the period 1979 to April 30, 1998. All nonconvertible bonds of the parent firm that have trader quotes available in and around the spin-off announcement month are identified from the monthly bond price data in the Fixed Income Database (FID). Each bond is tracked from the announcement month to the completion of the spin-off, defined as the spin-off event period. The announcement month is identified as month 0. Monthly total return is obtained from the Fixed Income Database for the announcement month. A risk-maturity-adjusted benchmark index is constructed from ten Lehman Brothers Corporate Bond indexes in the dimension of risk and maturity. For each bond the return on the risk-maturity-benchmark index is subtracted from the corresponding monthly raw return to calculate the abnormal announcement return. The average abnormal announcement return is calculated for different subsamples (i.e., the sample of the bonds that disappeared, and the sample of bonds that remained outstanding between the announcement month and the completion (ex-date) of each spin-off). The significance of the mean is determined using a two-tailed t-statistic. The last two rows of the table give the t-statistics for the difference in means of the subsamples. T-statistics for difference in means of the announcement returns are calculated for the paired sample of bonds for the same firm, between the bonds that disappeared and the bond that remained outstanding during the spin-off event period for the same firm. T-statistics are also used to test for the difference in means of the announcement returns of all the disappeared bonds and the bonds outstanding for all the firms in the sample during the spin-off event period. ***,**,* indicate significance at the 1%, 5%, 10% level of confidence respectively.

No. of parent firms having trader quoted bond data available in the month of the spin-off announcement	37
No. of bonds of parent firms having bond data available in the month of the spin-off announcement	134
No. of bonds of parent firms that disappeared between the announcement month and the ex-date of the spin-off	10
No. of bonds of the same parent firms that did not disappear between the announcement month and the ex-date of the spin-off	18
Average announcement return of all bonds that disappeared between the announcement month and the ex-date of the spin-off, for the entire sample of parent firms	0.4124 *
Average announcement return of all bonds that did not disappear between the announcement month and the ex-date of the spin-off, for the paired sample of parent firms	-0.3491 **
Average announcement return of all bonds that did not disappear between the announcement month and the ex-date of the spin-off, for the entire sample of parent firms	-0.2585 ***
t-statistics for the test of difference in means between the announcement returns of bonds that disappeared and the announcement returns of bonds that did not disappeared for the paired sample of parent firms	2.361 **
t-statistics for the test of difference in means between the announcement returns of bonds that disappeared and the announcement returns of bonds that did not disappeared for the entire sample of parent firms	2.933 **

Table 14

Bond rating changes for the parent spin-off sample.

Details of number of firms (bonds) that experienced S&P or Moody's bond rating changes either between one month prior to the spin-off announcement and one month, or six months, or one year subsequent to the announcement date.

Months around announcement month	-1 to +1	-1 to +6	-1 to +12
Panel A: No. of firms			
Increase in bond rating	0	4	5
Decrease in bond ratings	3	4	15
No change in rating	34	29	17
Total	37	37	37
Panel B: No. of bonds			
Increase in bond rating	0	11	12
Decrease in bond ratings	29	32	56
No change in rating	94	80	55
Total	123	123	123

Table 15

Risk-maturity-adjusted abnormal bond returns around the merger/acquisition announcement for all bonds of the matched acquirer sample.

Abnormal returns for all the nonconvertible bonds of a sample of acquirer firms that announced and completed a merger/acquisition between 1979 to April 30, 1998 and matched to the spin-off sample by year of announcement and industry of parent firm in the spin-off. Mergers/acquisitions are identified from the *SDC Platinum Mergers and Acquisition* database. All nonconvertible bonds of the parent firm that have trader quotes available in and around the merger announcement month are identified from the monthly bond price data in the Fixed Income Database (FID). Monthly total return is obtained from the Fixed Income Database for each event month. The announcement month is identified as month 0. A risk-maturity-adjusted benchmark index is constructed from ten Lehman Brothers Corporate Bond indexes in the dimensions of risk and maturity. For each bond the return on the risk- maturity-benchmark index is subtracted from the corresponding monthly raw return in each event month to calculate the abnormal return. The significance of the mean is determined using a two-tail t-statistic. The last column of the table gives the proportion of bonds with positive abnormal returns. Binomial tests for whether this proportion is significantly different from 50% are also reported in the same column. ***,**,* indicate significance at the 1%, 5%, 10% level of confidence respectively for the Binomial tests.

Event Month	No. of firms	No. of bonds	Mean abnormal return %	t-statistic for mean abnormal return	% of bonds with positive abnormal returns
-12	116	473	0.1388	3.71	54.76% **
-11	118	496	0.0558	1.45	57.46% ***
-10	115	513	0.0496	1.21	49.32%
-9	119	523	0.0006	0.02	50.86%
-8	125	546	-0.0714	-2.41	46.34% *
-7	126	552	-0.0177	-0.57	49.46%
-6	129	570	-0.0097	-0.33	47.72%
-5	129	581	0.0605	1.81	51.64%
-4	129	595	0.0408	1.21	53.45% *
-3	129	601	-0.0762	-2.53	44.93% **
-2	131	610	-0.0180	-0.57	50.66%
-1	133	615	-0.0033	-0.12	49.11%
0	133	619	-0.0186	-0.64	48.79%
1	132	624	-0.0799	-2.77	46.15% **
2	133	636	-0.0795	-2.47	46.54% *
3	132	643	-0.0304	-1.12	47.74%
4	132	644	-0.0487	-1.53	46.58% *
5	132	650	-0.0415	-1.45	47.23%
6	132	644	-0.0709	-2.29	45.19% **
7	133	650	0.0036	0.13	50.92%
8	133	655	-0.0263	-0.93	48.55%
9	133	667	0.0257	0.99	50.37%
10	132	676	-0.0611	-2.40	44.23% ***
11	131	678	-0.0434	-1.84	47.94%
12	135	690	-0.1035	-4.56	42.46% ***

Table 16

Risk-maturity-adjusted abnormal bond returns around the merger/acquisition announcement averaged for one bond per firm of the matched acquirer sample.

Abnormal returns for all the nonconvertible bonds of a sample of acquirer firms that announced and completed a merger/acquisition between 1979 to April 30, 1998 and matched to the spin-off sample by year of announcement and industry of parent firm. Mergers/acquisitions are identified from the *SDC Platinum Mergers and Acquisition* database. All nonconvertible bonds of the parent firm that have trader quotes available in and around the merger announcement month are identified from the monthly bond price data in the Fixed Income Database (FID). Monthly total return is obtained from the Fixed Income Database for each event month. The announcement month is identified as month 0. A risk-maturity-adjusted benchmark index is constructed from ten Lehman Brothers Corporate Bond indexes in the dimensions of risk and maturity. For each bond the return on the risk-maturity- benchmark index is subtracted from the corresponding monthly raw return in each event month to calculate the abnormal return. To calculate the abnormal returns on a per firm basis, values are first aggregated across all bonds for the same firm and then averaged across firms in each event month. The significance of the mean is determined using a two-tail t-statistic. The last column of the table gives the proportion of bonds with positive abnormal returns. Binomial tests for whether this proportion is significantly different from 50% are also reported in the same column. ***,**,* indicate significance at the 1%, 5%, 10% level of confidence respectively for the Binomial tests.

Event Month	No. of bonds	No. of firms	Mean abnormal return %	t-statistic for mean abnormal return	% of firms with positive abnormal returns
-12	473	116	0.1424	2.02	59.48% **
-11	496	118	0.0629	1.02	56.78%
-10	513	115	0.1142	0.95	46.09%
-9	523	119	-0.0405	-0.64	44.54%
-8	546	125	-0.1076	-2.11	40.00% **
-7	552	126	0.0173	0.30	51.59%
-6	570	129	0.0619	1.21	50.39%
-5	581	129	0.0476	0.63	49.61%
-4	595	129	0.0814	0.82	44.19%
-3	601	129	-0.1088	-2.26	34.88% ***
-2	610	131	-0.0701	-1.45	45.04%
-1	615	133	0.0252	0.48	49.62%
0	619	133	0.0099	0.22	46.62%
1	624	132	0.0004	0.01	46.21%
2	636	133	-0.0705	-1.47	42.11% *
3	643	132	-0.0420	-0.85	46.21%
4	644	132	-0.0220	-0.41	43.18%
5	650	132	-0.0316	-0.63	42.42% *
6	644	132	-0.0387	-0.71	43.94%
7	650	133	0.0433	0.80	51.88%
8	655	133	-0.0419	-0.86	47.37%
9	667	133	0.0138	0.30	55.64%
10	676	132	0.0472	1.01	50.76%
11	678	131	-0.0202	-0.52	50.38%
12	690	135	-0.0993	-2.77	41.48% ***

Table 17

Risk-maturity-adjusted cumulative abnormal bond returns around the merger/acquisition announcement averaged for one bond per firm of the matched acquirer sample.

Cumulative abnormal returns (CAR) for all the nonconvertible bonds of a sample of acquirer firms that announced and completed a merger/acquisition between 1979 to April 30, 1998 and matched to the spin-off sample by year of announcement and industry of parent firm. Mergers/acquisitions are identified from the *SDC Platinum Mergers and Acquisition* database. All nonconvertible bonds of the parent firm that have trader quotes available in and around the spin-off announcement month are identified from the monthly bond price data in the Fixed Income Database (FID). Monthly total return is obtained from the Fixed Income Database for each event month. The announcement is identified as month 0. A risk-maturity-adjusted benchmark index is constructed from ten Lehman Brothers Corporate Bond indexes in the dimension of risk and maturity. For each bond the return on the risk-maturity-benchmark index is subtracted from the corresponding monthly raw return in each event month to calculate the abnormal return. The abnormal returns are computed on a per firm basis, by first aggregating across all bonds for the same firm and then taking the average across firms in each event month. Cumulative abnormal returns are then calculated for three event windows, i.e., For three months, seven months, and 13 months, around the merger/acquisition announcement month. The parametric test statistic of Barber and Lyon (1997) is used to test the significance of the mean cumulative abnormal return.

Period	CAR -1 to +1	CAR -3 to +3	CAR -6 to +6
Mean %	0.037	-0.244	-0.122
t-statistic	0.460	-1.878	-0.618
No. of firms	132	130	127

Table 18

Industry-maturity-adjusted abnormal bond returns around the merger/acquisition announcement for all bonds of the matched acquirer sample.

Abnormal returns for all the nonconvertible bonds of a sample of acquirer firms that announced and completed a merger/acquisition between 1979 to April 30, 1998 and matched to the spin-off sample by year of announcement and industry of parent firm. Mergers/acquisitions are identified from the *SDC Platinum Mergers and Acquisition* database. All nonconvertible bonds of the parent firm that have trader quotes available in and around the merger announcement month are identified from the monthly bond price data in the Fixed Income Database (FID). Monthly total return is obtained from the Fixed Income Database for each event month. The announcement month is identified as month 0. An industry-maturity-adjusted benchmark index is constructed from six Lehman Brothers Corporate Bond indexes in the dimensions of industry and maturity. For each bond the return on the industry-maturity-benchmark index is subtracted from the corresponding monthly raw return in each event month to calculate the abnormal return. The significance of the mean is determined using a two-tail t-statistic. The last column of the table gives the proportion of bonds with positive abnormal returns. Binomial tests for whether this proportion is significantly different from 50% are also reported in the same column. ***,**,* indicate significance at the 1%, 5%, 10% level of confidence respectively for the Binomial tests.

Event Month	No. of firms	No. of bonds	Mean abnormal return %	t-statistic for mean abnormal return	% of bonds with positive abnormal returns
-12	116	477	0.1008	2.68	53.88% *
-11	118	499	0.0708	1.88	58.12% ***
-10	115	516	0.0279	0.70	47.09%
-9	119	526	-0.0039	-0.11	50.57%
-8	125	549	-0.0953	-3.31	45.36% **
-7	126	555	-0.0427	-1.41	43.96% ***
-6	129	573	-0.0152	-0.50	46.95%
-5	129	583	0.0793	2.50	51.29%
-4	129	597	0.0255	0.77	51.26%
-3	129	604	-0.0428	-1.47	44.37% ***
-2	131	612	-0.0192	-0.62	47.88%
-1	133	617	0.0458	1.67	53.00%
0	133	621	-0.0125	-0.45	48.63%
1	132	626	-0.0530	-1.97	45.69% ***
2	133	638	-0.0535	-1.73	50.78%
3	132	645	-0.0058	-0.22	46.98%
4	132	646	-0.0552	-1.79	46.44% **
5	132	652	-0.0264	-0.91	46.17% **
6	132	646	-0.0510	-1.71	45.98% **
7	133	652	0.0074	0.27	49.08%
8	133	657	-0.0089	-0.33	50.08%
9	133	669	0.0442	1.74	52.91%
10	132	678	-0.0089	-0.37	46.76% *
11	131	680	-0.0120	-0.53	50.00%
12	135	692	-0.0200	-0.91	48.99%

Table 19

Industry-maturity-adjusted abnormal bond returns around the merger/acquisition announcement averaged for one bond per firm of the matched acquirer sample.

Abnormal returns for all the nonconvertible bonds of a sample of acquirer firms that announced and completed a merger/acquisition between 1979 to April 30, 1998 and matched to the spin-off sample by year of announcement and industry of parent firm. Mergers/acquisitions are identified from the *SDC Platinum Mergers and Acquisition* database. All nonconvertible bonds of the parent firm that have trader quotes available in and around the merger announcement month are identified from the monthly bond price data in the Fixed Income Database (FID). Monthly total return is obtained from the Fixed Income Database for each event month. The announcement month is identified as month 0. An industry-maturity-adjusted benchmark index is constructed from six Lehman Brothers Corporate Bond indexes in the dimensions of industry and maturity. For each bond the return on the industry-maturity-benchmark index is subtracted from the corresponding monthly raw return in each event month to calculate the abnormal return. To calculate the abnormal returns on a per firm basis, values are first aggregated across all bonds for the same firm and then averaged across firms in each event month. The significance of the mean is determined using a two-tail t-statistic. The last column of the table gives the proportion of bonds with positive abnormal returns. Binomial tests for whether this proportion is significantly different from 50% are also reported in the same column. ***,**,* indicate significance at the 1%, 5%, 10% level of confidence respectively for the Binomial tests.

Event Month	No. of bonds	No. of firms	Mean abnormal return %	t-statistic for mean abnormal return	% of firms with positive abnormal returns
-12	477	116	0.1106	1.44	56.03%
-11	499	118	0.0976	1.51	55.93%
-10	516	115	0.1100	0.93	46.09%
-9	526	119	-0.0739	-1.13	43.70%
-8	549	125	-0.1346	-2.71	39.20% **
-7	555	126	-0.0040	-0.07	47.62%
-6	573	129	0.0829	1.42	49.61%
-5	583	129	0.0788	1.14	52.71%
-4	597	129	0.0728	0.72	48.84%
-3	604	129	-0.0789	-1.69	37.21% ***
-2	612	131	-0.0544	-1.19	44.27%
-1	617	133	0.0908	1.83	54.89%
0	621	133	0.0113	0.26	46.62%
1	626	132	0.0101	0.26	46.21%
2	638	133	-0.0451	-1.05	45.86%
3	645	132	0.0006	0.01	45.45%
4	646	132	0.0117	0.23	43.18%
5	652	132	0.0248	0.46	50.00%
6	646	132	-0.0272	-0.50	47.73%
7	652	133	0.0498	0.94	53.38%
8	657	133	-0.0242	-0.55	51.88%
9	669	133	0.0452	1.01	60.90% ***
10	678	132	0.1071	2.37	56.06%
11	680	131	0.0419	1.09	56.49%
12	692	135	-0.0249	-0.71	48.15%

Table 20

Industry-maturity-adjusted cumulative abnormal bond returns around the merger/acquisition announcement averaged for one bond per firm of the matched acquirer sample.

Cumulative abnormal returns (CAR) for all the nonconvertible bonds of a sample of acquirer firms that announced and completed a merger/acquisition between 1979 to April 30, 1998 and matched to the spin-off sample by year of announcement and industry of parent firm. Mergers/acquisitions are identified from the *SDC Platinum Mergers and Acquisition* database. All nonconvertible bonds of the parent firm that have trader quotes available in and around the spin-off announcement month are identified from the monthly bond price data in the Fixed Income Database (FID). Monthly total return is obtained from the Fixed Income Database for each event month. The announcement is identified as identified as month 0. A industry-maturity-adjusted benchmark index is constructed from six Lehman Brothers Corporate Bond indexes in the dimension of industry and maturity. For each bond the return on the industry-maturity-benchmark index is subtracted from the corresponding monthly raw return in each event month to calculate the abnormal return. The abnormal returns are computed on a per firm basis, by first aggregating across all bonds for the same firm and then taking the average across firms in each event month. Cumulative abnormal returns are then calculated for three event windows, i.e., for three months, seven months, and 13 months, around the spin-off announcement month. The parametric test statistic of Barber and Lyon (1997) is used to test the significance of the mean cumulative abnormal return.

Period	CAR -1 to +1	CAR -3 to +3	CAR -6 to +6
Mean %	0.114	-0.076	0.2225
t-statistic	1.424	-0.549	1.065
No. of firms	132	128	126

Table 21

Cross-sectional variation in the risk-adjusted monthly abnormal returns response in the bond markets to the merger/acquisition announcement by a matched sample of acquirer firms.

Cumulative abnormal returns (CAR) for all the nonconvertible bonds of a sample of acquirer firms that announced and completed a merger/acquisition between 1979 to April 30, 1998 and matched to the spin-off sample by year of announcement and industry of parent firm. Mergers/acquisitions are identified from the *SDC Platinum Mergers and Acquisition* database. All nonconvertible bonds of the parent firm that have trader quotes available in and around the spin-off announcement month are identified from the monthly bond price data in the Fixed Income Database (FID). Monthly total return is obtained from the Fixed Income Database for each event month. The announcement is identified as month 0. A risk-maturity-adjusted benchmark index is constructed from ten Lehman Brothers Corporate Bond indexes in the dimension of risk and maturity. For each bond, the return on the risk-maturity-benchmark index is subtracted from the corresponding monthly raw return in each event month to calculate the abnormal return. The abnormal returns are computed on a per firm basis, by first aggregating across all bonds for the same firm and then taking the average across firms in each event month. Cumulative abnormal returns are then calculated for three event windows, i.e., for three months, seven months, and 13 months, around the merger/acquisition announcement month. Panel A reports the abnormal returns for the group of firms that have a positive bond market response to the announcement in month 0. Panel B reports the abnormal returns for the group of firms having a negative bond market response to the announcement in month 0. Welch's approximation of Student t-distribution is used to test the differences in the means of the two groups.

Period	Month 0	CAR -1 to +1	CAR -3 to +3	CAR -6 to +6
Panel A: positive returns				
Mean %	0.387	0.840	1.172	1.764
t-statistic	6.809	7.364	6.529	7.088
No. of firms	62	54	45	54
Panel B: negative returns				
Mean %	-0.320	-0.523	-0.994	-1.518
t-statistic	-9.172	-10.191	-9.289	-10.304
No. of firms	71	77	85	73
Panel C : Differences in means				
t-statistic	10.658	10.016	10.364	7.177

Table 22

Cross-sectional variation in the industry-maturity-adjusted monthly abnormal returns response in the bond markets to the merger/acquisition announcement by a matched sample of acquirer firms.

Cumulative abnormal returns (CAR) for all the nonconvertible bonds of a sample of acquirer firms that announced and completed a merger/acquisition between 1979 to April 30, 1998 and matched to the spin-off sample by year of announcement and industry of parent firm. Mergers/acquisitions are identified from the *SDC Platinum Mergers and Acquisition* database. All nonconvertible bonds of the parent firm that have trader quotes available in and around the spin-off announcement month are identified from the monthly bond price data in the Fixed Income Database (FID). Monthly total return is obtained from the Fixed Income Database for each event month. The announcement is identified as month 0. An industry-maturity-adjusted benchmark index is constructed from ten Lehman Brothers Corporate Bond indexes in the dimension of industry and maturity. For each bond the return on the industry-maturity-benchmark index is subtracted from the corresponding monthly raw return in each event month to calculate the abnormal return. The abnormal returns are computed on a per firm basis, by first aggregating across all bonds for the same firm and then taking the average across firms in each event month. Cumulative abnormal returns are then calculated for three event windows, i.e., for three months, seven months, and 13 months, around the spin-off announcement month. Panel A reports the abnormal returns for the group of firms that have a positive bond market response to the announcement in month 0. Panel B reports the abnormal returns for the group of firms having a negative bond market response to the announcement in month 0. Welch's approximation of Student t-distribution is used to test the differences in the means of the two groups.

Period	Month 0	CAR -1 to +1	CAR -3 to +3	CAR -6 to +6
Panel A: positive returns				
Mean %	0.389	0.715	1.251	2.140
t-statistic	7.129	6.916	6.744	7.788
No. of firms	62	66	52	56
Panel B: negative returns				
Mean %	-0.318	-0.487	-0.984	-1.312
t-statistic	-9.162	-7.803	-9.286	-9.919
No. of firms	71	66	76	70
Panel C : Differences in means				
t-statistic	10.935	9.955	10.461	11.319

Table 23

Bond rating changes for bonds of matched-acquirer sample.

Details of number of firms that experienced S&P or Moody's bond rating changes either between three months prior to the mergers/acquisition announcement and one month, or six months, or one year subsequent to the announcement date.

Months around announcement month	-3 to +1	-3 to +6	-3 to +12
No. of firms			
Increase in bond rating	5	6	7
Decrease in bond ratings	0	3	14
No change in rating	128	124	112
Total	133	133	133

Table 24

Summary statistics for the spin-off sample.

This table lists the parent and subsidiary firms statistics for the pre-spin-off year (i.e., in the year prior to the spin-off (t-1)) and the year post-spin-off. Book leverage is calculated as the ratio of long-term debt and current liabilities to book value of assets. Market-leverage is defined as the ratio of long-term debt and current liabilities to the sum of the market value of equity and book value of debt. Interest coverage is calculated as the ratio of operating cash flows to interest expenses. ROA is calculated as ratio of earnings before interest, depreciation, and taxes to market value of assets of parent firm. ROA is adjusted for industry performance by subtracting the median ratio for all firms in the Compustat file with the same four-digit SIC code. ***,**,* indicate significance at the 1%, 5%, 10% level of confidence respectively.

Panel A: Parent firms	Pre-spin-off	Post-spin-off	Change
Total debt (millions)	13715.01157	11428.10036	-2305.74 *
Size (millions)	36182.73	31473.76	-5546 *
Book leverage	34.4%	33.3%	-1.3% ***
Market-leverage	38.8%	34.2%	-4.3% **
Interest Coverage	5.53	6.98	1.29 *
Industry adjusted ΔROA	-1.3%	-3.3%	-2.0%

Panel B: Subsidiary firms	Pre-spin-off	Post-spin-off	Change
Total debt (millions)	4402.64	5222.28	1626.67
Size (millions)	8806.61	9757.53	1977.71 *
Book leverage	29.2%	34.6%	5.1%
Market-leverage	45.4%	38.1%	-13.1%
Relative size of subsidiary to parent	22.3%	28.7%	8.3%

Table 25

Summary statistics of the matched mergers/acquisition sample.

This table lists the acquirer and target firms' statistics for the pre-merger/acquisition year (i.e., in the year prior to the merger/acquisition (t-1)) and the year post-merger/acquisition. The mergers/acquisition sample includes acquirer firms that announced and completed a merger/ acquisition between 1979 to April 30, 1998 and are matched to the spin-off sample by year of announcement and industry of parent firm. Mergers/acquisitions are identified from *the SDC Platinum Mergers and Acquisition* database. Book leverage is calculated as the ratio of long-term debt and current liabilities to book value of assets. Market-leverage is defined as the ratio of long-term debt and current liabilities to the sum of the market value of equity and book value of debt. Interest coverage is calculated as the ratio of operating cash flows to interest expenses. ROA is calculated as ratio of earnings before interest, depreciation, and taxes to market value of assets of parent firm. ROA is adjusted for industry performance by subtracting the median ratio for all firms in the Compustat file with the same four- digit SIC code.***,**,* indicate significance at the 1%, 5%, 10% level of confidence respectively.

Panel A: Acquirer firms			
	Pre-merger	Post-merger	Change
Total debt (millions)	7792.69	12141.24	4133.90***
Size (millions)	34374.37	46867.74	11538.24***
Book leverage	23.6%	26.4%	3.0%***
Market-leverage	46.6%	46.9%	1.2%
Interest Coverage	5.66	6.13	47.1%
Industry adjusted ΔROA	-1.1%	-4.5%	-3.4%***
Panel B: Target firms			
	Pre-merger	Post-merger	Change
Total debt (millions)	3946.88	11503.47	3647.88**
Size (millions)	13485.30	36088.59	7512.31**
Book leverage	25.8%	33.9%	5.4%**
Market-leverage	43.6%	42.7%	0.1%

Table 26

Correlation matrix - spin-off sample.

Pearson correlation coefficients for each variable for the 37 firms which had data available. ΔBondholder wealth is the index-adjusted return of parent firm bonds in the month of announcement. Δleverage of parent is the change in market leverage of the parent. ΔROA is the change in the ratio of earnings before interest depreciation and taxes to market value of assets. ΔRating is defined Dummy=1 if credit rating decreased post-spinoff. Post-Mariott is defined Dummy=1 if announcement date is after Marriott spin-off ex-date.Focus is defined as .Dummy=1 if parent firm focus increases post-spinoff. Post-spinoff realative size is the ratio of size of subsidiary to parent size. Post-spinoff relative leverage is ratio of market leverage of parent to that of subsidiary. ΔROA of parent XΔ Rating measures the interaction of post-spinoff change in operational efficiency of parent with the change in risk of parent firm. ***,**,* indicate significance at the 1%, 5% , 10% level of confidence resply.

	Δ Bondholder wealth	Pre-spin-off market leverage of parent	Δ leverage of parent	ΔROA of parent	Δ Rating	Post-Marriott	Focus	Post-spinoff relative size	Post-spinoff relative leverage	ΔROA X Δ Rating of parent	Focus XΔ ROA of parent
ΔBondholder wealth	1										
	.										
Pre-spin-off market leverage of	-0.164	1									
	(0.069) *	.									
Δleverage of parent	-0.267	-0.053	1								
	(0.061) *	(0.382)	.								
ΔROA of parent	0.047	0.041	0.104	1							
	(0.396)	(0.412)	(0.289)	.							
ΔRating	-0.081	0.095	-0.050	0.179	1						
	(0.317)	(0.291)	(0.387)	(0.159)	.						
Post-Marriott	-0.277	-0.141	-0.119	0.224	-0.133	1					
	(0.049) **	(0.206)	(0.248)	(0.105) *	(0.217)	.					
Focus	0.073	0.180	0.012	0.058	0.041	0.159	1				
	(0.334)	(0.147)	(0.474)	(0.373)	(0.405)	(0.174)	.				
Postspinoff relative size	-0.138	0.025	0.001	0.020	0.181	0.301	0.121	1			
	(0.211)	(0.443)	(0.497)	(0.456)	(0.145)	(0.037) **	0.241	.			
Post-spinoff relative leverage	-0.143	0.175	0.180	0.144	0.192	0.23	0.12	0.335	1		
	(0.222)	(0.177)	(0.171)	(0.232)	(0.151)	(0.107) *	0.259	(0.033) **	.		
ΔROA of parent X ΔRating	-0.240	0.012	-0.063	0.217	0.043	0.154	0.235	0.205	-0.257	1	
	(0.089) *	(0.474)	(0.368)	(0.113)	(0.406)	(0.196)	0.094 *	(0.13)	(0.093) *		
Focus XΔROA of parent	-0.050	0.008	0.038	0.961	0.182	0.2146	-0.121	-0.009	0.1061	0.1711	1
	(0.384)	(0.482)	(0.412)	(0.000) ***	(0.140)	(0.101) *	(0.237)	(0.478)	(0.266)	(0.156)	

Table 27

Correlation matrix - mergers & acquisition sample.

Pearson correlation coefficients for each variable for the firms in the Mergers and Acquisition sample for which Compustat data is available. Δ Bondholder wealth is the index-adjusted return of parent firm bonds in the month of announcement. Leverage of parent is the change in market (book) leverage of the parent.
Δ ROA is the change in the ratio of earnings before interest depreciation and taxes to market value of assets. "yr" is the Year of announcement.
Δ Rating is defined Dummy=1 if credit rating decreased in the twelve months post merger/acquisition..
***,**,* indicate significance at the 1%, 5% , 10% level of confidence resply.

		Δ Bondholder returns	Variance (Rating) Change	Acquirer Pre Market Value	Acquirer Change in Market Value	Acquirer Pre Total debt	Acquirer Change in Total Debt	Acquirer Pre Bookleverage	Acquirer Change in Bookleverage	Acquirer Pre Marketleverage	Acquirer Post Marketleverage	Acquirer Change in Marketleverage	Acquirer Pre-merger Size	Acquirer Change in ROA	Acquirer Change in industry adjusted ROA	Target Pre Market Value	Target Change in Market Value	Target Pre Total Debt	Target Change in Total Debt
Δ Bondholder returns	Pearson Correlation	1	-0.259	0.029	-0.05	0.087	-0.096	0.012	-0.202	0.133	0.212	-0.293	0.072	-0.3	0.299	0.21	-0.207	0.186	-0.206
	Significance	.	**0.035**	0.421	0.371	0.273	0.261	0.467	**0.082**	0.184	**0.081**	**0.025**	0.309	**0.025**	**0.026**	**0.091**	0.198	0.119	0.199
Variance (Rating) Change	Pearson Correlation		1	0.048	-0.028	0.011	0.006	0.052	-0.146	-0.154	-0.127	0.031	-0.019	0.04	0.019	-0.192	0.003	-0.07	-0.008
	Significance			0.374	0.428	0.471	0.485	0.36	0.159	0.149	0.202	0.419	0.447	0.4	0.451	0.111	0.496	0.331	0.486
Acquirer Pre Market Value	Pearson Correlation			1	-0.162	0.857	-0.15	0.292	0.217	-0.024	-0.071	0.005	0.727	0.12	-0.259	0.567	-0.419	0.613	-0.515
	Significance				0.144	**0**	0.163	**0.022**	**0.071**	0.437	0.321	0.487	**0**	0.227	**0.051**	**0**	**0.037**	**0**	**0.012**
Acquirer Change in Market Value	Pearson Correlation				1	-0.455	0.926	0.132	0.274	-0.424	-0.399	-0.028	-0.613	0.051	0.117	-0.344	0.907	-0.406	0.884
	Significance					**0.001**	**0**	0.194	**0.034**	**0.002**	**0.003**	0.427	**0**	0.38	0.242	**0.017**	**0**	**0.006**	**0**
Acquirer Pre Total debt	Pearson Correlation					1	-0.557	0.297	0.056	0.274	0.239	-0.019	0.836	0.042	-0.215	0.781	-0.68	0.851	-0.797
	Significance						**0**	**0.018**	0.351	**0.03**	**0.057**	0.45	**0**	0.394	**0.083**	**0**	**0.001**	**0**	**0**
Acquirer Change in Total Debt	Pearson Correlation						1	-0.031	0.283	-0.538	-0.579	0.1	-0.623	0.118	0.057	-0.456	0.873	-0.523	0.899
	Significance							0.418	**0.027**	**0**	**0**	0.257	**0**	0.234	0.363	**0.002**	**0**	**0**	**0**
Acquirer Pre Bookleverage	Pearson Correlation							1	0.261	0.016	-0.174	-0.183	-0.053	0.022	-0.27	0.222	0.139	0.187	0.006
	Significance								**0.035**	0.458	0.126	0.114	0.356	0.443	**0.04**	**0.078**	0.285	0.117	0.49
Acquirer Change in Bookleverage	Pearson Correlation								1	-0.249	-0.518	-0.12	-0.006	0.329	-0.236	0.043	0.292	-0.069	0.276
	Significance									**0.045**	**0**	0.216	0.484	**0.017**	**0.066**	0.394	0.112	0.331	0.127
Acquirer Pre Marketleverage	Pearson Correlation									1	0.879	0.05	0.314	-0.213	-0.103	0.169	-0.64	0.28	-0.653
	Significance										**0**	0.372	**0.015**	**0.091**	0.26	0.149	**0.002**	**0.04**	**0.001**
Acquirer Post Marketleverage	Pearson Correlation										1	-0.274	0.314	-0.368	0.123	0.236	-0.626	0.347	-0.675
	Significance											**0.034**	**0.018**	**0.011**	0.232	**0.077**	**0.002**	**0.016**	**0.001**
Acquirer Change in Marketleverage	Pearson Correlation											1	0.03	0.183	-0.379	-0.177	-0.003	-0.126	0.123
	Significance												0.422	0.135	**0.009**	0.144	0.496	0.225	0.308
Acquirer Pre-merger Size	Pearson Correlation												1	0.012	-0.193	0.544	-0.792	0.617	-0.854
	Significance													0.468	0.107	**0**	**0**	**0**	**0**
Acquirer Change in ROA	Pearson Correlation													1	-0.256	-0.022	0.068	0.058	0.118
	Significance														**0.049**	0.45	0.401	0.368	0.331

Table 28

Effects of leverage in Model 1 for spin-off sample.

	Regression 1	*Regression 2*
Intercept	-0.119	-0.058
Δ leverage	-0.270 *	-0.265 *
Ppre-leverage	-0.175	-0.167
PSpost-leverage		-0.026
SPpost-size		-0.125
R-square	9.80%	11.70%
N	37	37

Table 29

Effects of changes in operational efficiency (Model 2) for spin-off sample.

This table shows cross-sectional regressions relating announcement-period abnormal returns of parent firm bonds to change in operational efficiency of parent firm. Change in operational efficiency of parent firm (Δ PROA) is measured as the difference in pre- and post-spin-off industry-adjusted ROA of parent. ROA is calculated as ratio of earnings before interest, depreciation, and taxes to market value of assets of parent firm. ROA is adjusted for industry performance by subtracting the median ratio for all firms in the Compustat file with the same four-digit SIC code. Change in Focus (Focus) is defined as Dummy=1 if parent firm Focus increases post-spin-off. Post-spin-off relative size of the subsidiary to the parent (SPpost-size) is used as control variable. Δ ROA of parent X Focus measures the interaction of post-spin-off change in operational efficiency of parent with the change in focus of parent firm. Dependent variable is the index-adjusted-abnormal abnormal return of parent firm bonds in the month of announcement. ***,**,* indicate significance at the 1%, 5%, 10% level of confidence respectively.

	Regression 1	*Regression 2*	*Regression 3*
Intercept	-0.137	-0.246	-0.048
Δ PROA	0.046	0.041	1.327 **
Focus		0.087	-0.141
SPpost-size	-0.138	-0.148	
Δ PROA * Focus			-1.342 **
R-square	2.10%	2.90%	13.37%
N	37	37	37

Table 30

Effects of changes in business risk (Model 3) for spin-off sample.

This table shows cross-sectional regressions relating announcement-period abnormal returns of parent firm bonds to change in variance of parent firm's rate of return. Change in variance of parent firm's rate of return is measured as the change in credit ratings of parent firms (Rating) because of the spin-off announcement. Δ Rating is defined as Dummy=1 if the credit rating of parent firm decreases because of the spin-off announcement. Post Marriott is defined as Dummy=1 if the announcement date was after the ex-date of the Marriott spin-off. Δ ROA of parent X Δ Rating measures the interaction of post-spin-off change in operational efficiency of parent with the change in risk of parent firm. Dependent variable is the index-adjusted-abnormal abnormal return of parent firm bonds in the month of announcement. ***,**,* indicate significance at the 1%, 5%, 10% level of confidence respectively.

	Regression 1	*Regression 2*
Intercept	-0.0385	-0.0378
Δ Rating	-0.0071	-0.0062
Post Marriott	-0.2301 *	-0.2313 *
Δ ROA of parent X Δ Rating		0.0166
R-square	5.24%	5.26%
N	36	36

Table 31

Temporal changes in bond market reactions to spin-offs.

This table shows cross-sectional regressions to study changes in bond market reactions to spin-offs over time. To study changes in bond market reactions to spin-offs over time that may or may not be attributed to the heightened bondholder activism following the Marriott spin-off, the spin-off sample is partitioned in the following ways: a) Spin-offs announced before October 1993 and spin-offs announced post October 1993 (including any announcements in October 1993), b) Spin-offs announced before 1988, between 1989 and September 1993, and post October 1993 c) Spin-offs announced between 1979 to 1990, between 1991 and 1995, and after January 1996 (including January 1996), and d) Spin-offs announced pre October 1993, between November 1993 and 1995, and after January 1996. Separate regressions are done on each individual time period dummy, separately for each partitioning of the sample. Dependent variable is the index-adjusted-abnormal abnormal return of parent firm bonds in the month of announcement. ***,**,* indicate significance at the 1%, 5%, 10% level of confidence respectively.

	Regression 1	*Regression 2*	*Regression 3*	*Regression 4*
Intercept	-0.04178	-0.09706	-0.21087**	-0.24547**
Dummy 1	-0.31437*			
Dummy 2		-0.24547*		
Dummy 3			-0.04722	
Dummy 4				-0.11168
R-square	5.03%	6.03%	-2.61%	-1.06%
N	37	37	37	37

Table 32

Effects of leverage (Model 1) for the sample of matched-acquirer firms.

This table shows cross-sectional regressions relating announcement-period abnormal returns of acquirer firm bonds to change in leverage of acquirer firm. Change in leverage of acquirer firm (Δ Aleverage) is measured as the difference in pre- and post-merger market (book) leverage ratio of acquirer. Market (book) leverage ratio is calculated as ratio of (long-term debt + current liabilities) to (Market value of equity + book value of debt). Pre-merger market (book) leverage of acquirer (Apre-leverage), post-merger ratio of leverage of the acquirer to leverage of the target (ATpost-leverage) and post-merger change in relative size of the target to the acquirer (ΔTAsize) are used as control variables. Dependent variable is the index-adjusted-abnormal abnormal return of acquirer firm bonds in the month of announcement. ***,**,* indicate significance at the 1%, 5%, 10% level of confidence respectively.

		Regression 1	*Regression 2*	*Regression 3*	*Regression 4*
Intercept		-0.326	-1.017	0.542	0.651
Δ leverage	Market	-0.216	-0.247*		
	Book			-0.252*	-0.251*
Apre-leverage	Market	0.185	0.173		
	Book			0.064	
ATpost-leverage		-0.138		-0.216	-0.227*
ΔTAsize		0.225*	0.228*	0.226*	0.225*
R-square		8.90%	9.00%	7.60%	9.10%
N		50	50	50	50

Table 33

Effects of changes in operational efficiency (Model 2) for the sample of matched-acquirer firms.

This table shows cross-sectional regressions relating announcement-period abnormal returns of acquirer firm bonds to change in operational efficiency of acquirer firm. Change in operational efficiency (Δ ROA) is measured as the difference in pre- and post-merger industry-adjusted ROA for the acquirer as well as the target firms. ROA is calculated as ratio of earnings before interest, depreciation, and taxes to market value of assets of acquirer firm and is adjusted for industry performance by subtracting the median ratio for all firms in the Compustat file with the same four-digit SIC code. A conglomerate merger (Conglomerate) is defined as a merger where the acquirer and the target firms have different 2-digit SIC codes. Post-merger change in relative size of the target to the acquirer (ΔTAsize) is used as a control variable. Dependent variable is the index-adjusted-abnormal abnormal return of acquirer firm bonds in the month of announcement. ***,**,* indicate significance at the 1%, 5%, 10% level of confidence respectively.

		Regression 1	*Regression 2*
Intercept		1.152	1.409
Δ ROA Acquirer	Raw	-0.19	-0.194
	Industry adjusted	0.203	0.212 *
Conglomerate		-0.365***	-0.375***
ΔTAsize		0.1	
Δ ROA Target	Raw	-0.091	
	Industry adjusted	0.221	0.203
R-square		20.90%	23.80%
N		50	50

Table 34

Effects of changes in risk (Model 3) for the sample of matched-acquirer firms.

This table shows cross-sectional regressions relating announcement-period abnormal returns of acquirer firm bonds to change in variance of acquirer firm's rate of return. Change in variance of acquirer firm's rate of return is measured as the change in credit ratings of acquirer firms (Rating) because of the merger announcement. Rating is defined as Dummy=-1 if the credit rating of acquirer firm decreases, Dummy=1 if the credit rating increases, and Dummy =0 if the credit rating remains unchanged because of the merger announcement. Change in leverage of acquirer firm (Δ Aleverage), measured as the difference in pre- and post-merger leverage ratio of acquirer; and conglomerate merger (Conglomerate), defined as a merger where the acquirer and the target firms have different 2-digit SIC codes, are used as control variables. Dependent variable is the index-adjusted-abnormal abnormal return of acquirer firm bonds in the month of announcement. ***,**,* indicate significance at the 1%, 5%, 10% level of confidence respectively.

	Regression 1	*Regression 2*
Intercept	-0.283	0.88
Δ Rating	-0.295***	-0.253*
Conglomerate		-0.323***
Δ Aleverage	-0.222*	-0.143
R-square	8.80%	16.80%
N	50	50

Table 35

Full effects model (Model 4) for spin-off sample.

This table shows cross-sectional regression to study the interaction effects of change in leverage, change in operational efficiency and change in variance of the returns of parent firm on the announcement-period abnormal returns of parent firm bonds. Change in leverage of parent firm (Δ Pleverage) is measured as the difference in pre- and post-spin-off market-leverage ratio of parent. Change in operational efficiency of parent firm (Δ PROA) is measured as the difference in pre- and post-spin-off industry-adjusted ROA of parent. Change in variance of parent firm's rate of return is measured as the change in credit ratings of parent firms (Rating) because of the spin-off announcement. Rating is defined as Dummy=1, if the credit rating of parent firm decreases because of the spin-off announcement. Δ ROA of parent X Δ Rating measures the interaction of post-spin-off change in operational efficiency of parent with the change in risk of parent firm. Focus X Δ ROA of parent measures the interaction of post-spin-off change in operational efficiency of parent with the increase in Focus of the parent. Change in Focus (Focus) is defined as Dummy=1 if parent firm Focus increases post-spin-off. Post Marriott is defined as Dummy=1 if the announcement date was after the ex-date of the Marriott spin-off. Dependent variable is the index-adjusted-abnormal abnormal return of parent firm bonds in the month of announcement. ***,**,* indicate significance at the 1%, 5%, 10% level of confidence respectively.

	Regression 1	*Regression 2*
Intercept	0.258	0.258
Ppre-leverage	-0.221 *	-0.225 *
Δ leverage	-0.424 ***	-0.430 ***
Δ PROA	1.753 ***	1.750 ***
Rating	-0.121	-0.125
Δ ROA of parent X Δ Rating	-0.296 *	-0.286 **
Focus	-0.054	-0.058
Focus X Δ ROA of parent	-1.571 ***	-1.572 ***
Post Marriott	-0.352 **	-0.356 **
SPpost-size	-0.032	
PSpost-leverage	0.014	
R-square	48.25%	48.18%
N	37	37

Table 36

Full effects model (Model 4) for the sample of matched-acquirer firms.

This table shows cross-sectional regression to study the interaction effects of change in leverage, change in operational efficiency and change in variance of the returns of acquirers firm on the announcement-period cumulative abnormal returns of acquirer firm bonds. Change in leverage of acquirer (Δ Aleverage) is measured as the difference in pre- and post-merger/acquisition market (book) leverage ratio of the acquirer. Change in operational efficiency of acquired firm (Δ ROA) is measured as the difference in pre- and post- merger industry-adjusted (raw) ROA of acquirer as well as target firms. Change in variance of acquirer firm's rate of return is measured as the change in credit ratings of parent firms (Rating) because of the merger announcement. Rating is defined as Dummy=-1 if the credit rating of acquirer firm decreases, Dummy=1 if the credit rating increases, and Dummy =0 if the credit rating remains unchanged. Pre-merger total debt of the acquirer, post-merger ratio of leverage of the acquirer to leverage of the target (ATpost-leverage) and post-merger change in relative size of the target to the acquirer (ΔTAsize), and conglomerate merger (Conglomerate), defined as a merger where the acquirer and the target firms have different 2-digit SIC codes, are used as control variables. Dependent variable is the index-adjusted-abnormal abnormal return of parent firm bonds in the month of announcement. ***,**,* indicate significance at the 1%, 5%, 10% level of confidence respectively.

		Regression 1	*Regression 2*	*Regression 3*
Intercept		2.1	2.144	2.501
Variance (Rating) Change		-0.24*	-0.224**	-0.225**
Acquirer Pre Total Debt		0.132	0.132	
Acquirer Change in leverage	Book	-0.088		
	Market		-0.046	
Δ ROA Acquirer	Raw	-0.183	-0.198	-0.209**
	Industry adjusted	0.241*	0.237**	0.225**
Δ ROA Target	Raw	-0.029	0.003	
	Industry adjusted	0.183	0.176	0.208**
ATpost-leverage		-0.22*	-0.193	-0.23**
ΔTAsize		0.043	0.022	
Conglomerate		-0.335***	-0.356***	-0.352***
R-square		27.60%	27.10%	31.80%
N		50	50	50

Figures

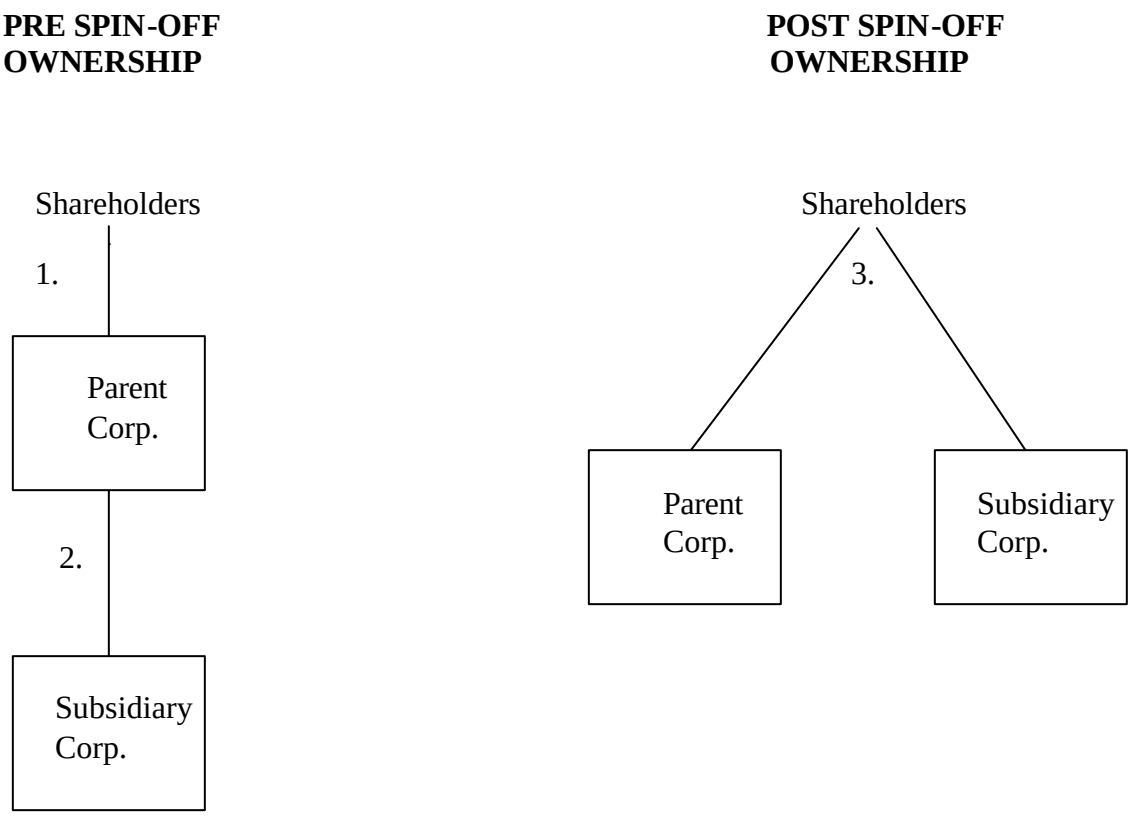

Figure 1 Diagrammatic representation of a spin-off

A spin-off occurs when a company distributes the common shares it owns in a controlled subsidiary to its existing shareholders, thereby creating a separate public company. At the time of the spin-off, the subsidiary becomes a stand-alone public entity that is administratively and financially independent of the parent. In effect, the consolidated firm is divided into two (or more) firms with an identical set of shareholders.

1. Shareholders (SH) own 100% of the stock of Parent (P).
2. P owns 100% of the stock of the Subsidiary (S).
3. P spins off S and distributes the stock of S to SH.

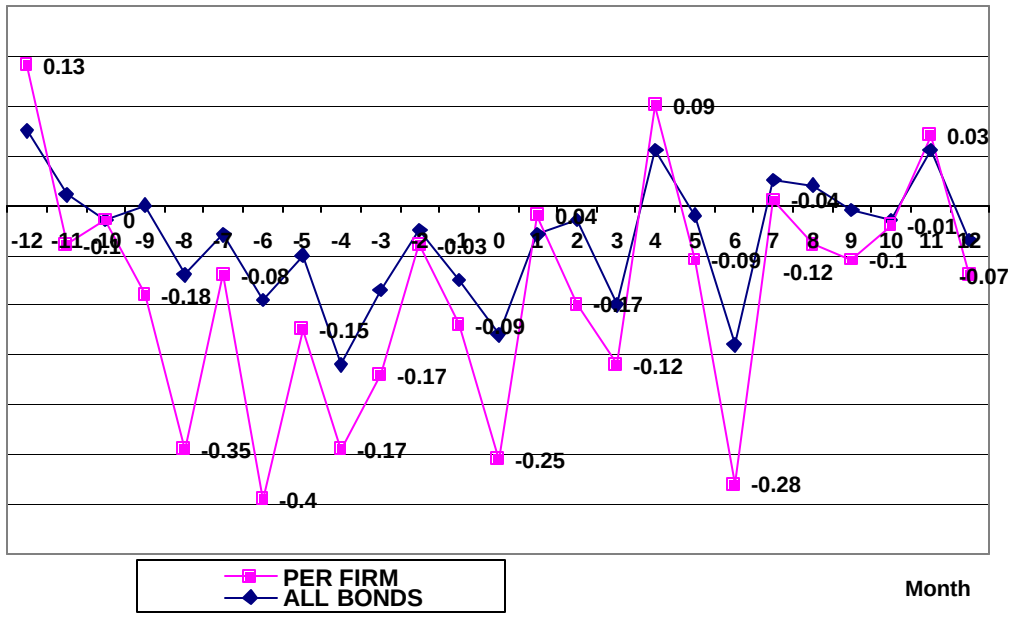

Figure 2 Distribution of risk-maturity-adjusted abnormal monthly bond market returns of the outstanding nonconvertible bonds of the parent firms around the month of the spin-off announcement.

Abnormal returns for all the non-convertible bonds of a sample of 37 firms that announced and completed a spin-off between 1979 to April 30, 1998. Spin-offs are identified from the CRSP tapes, the *Security Data Company's (SDC) Worldwide Acquisition database*, publications such as *Moody's Dividend Records, Mergers and Acquisitions*, and news wires and articles from *Lexis-Nexis* and the *Wall Street Journal* for the period 1979 to early 1998. All nonconvertible bonds of the parent firm that have trader quotes available in and around the spin-off announcement month are identified from the monthly bond price data in the Fixed Income Database (FID). Monthly total return is obtained from the Fixed Income Database for each event month. The announcement month is identified as "month 0". A risk-maturity adjusted benchmark index is constructed from ten Lehman Brothers Corporate Bond indexes in the dimension of risk and maturity. For each bond the return on the risk-maturity benchmark index is subtracted from the corresponding monthly raw return in each event month to calculate the abnormal return. To calculate the abnormal returns on a per firm basis, values are first aggregated across all bonds for the same firm and then averaged across firms in each event month.

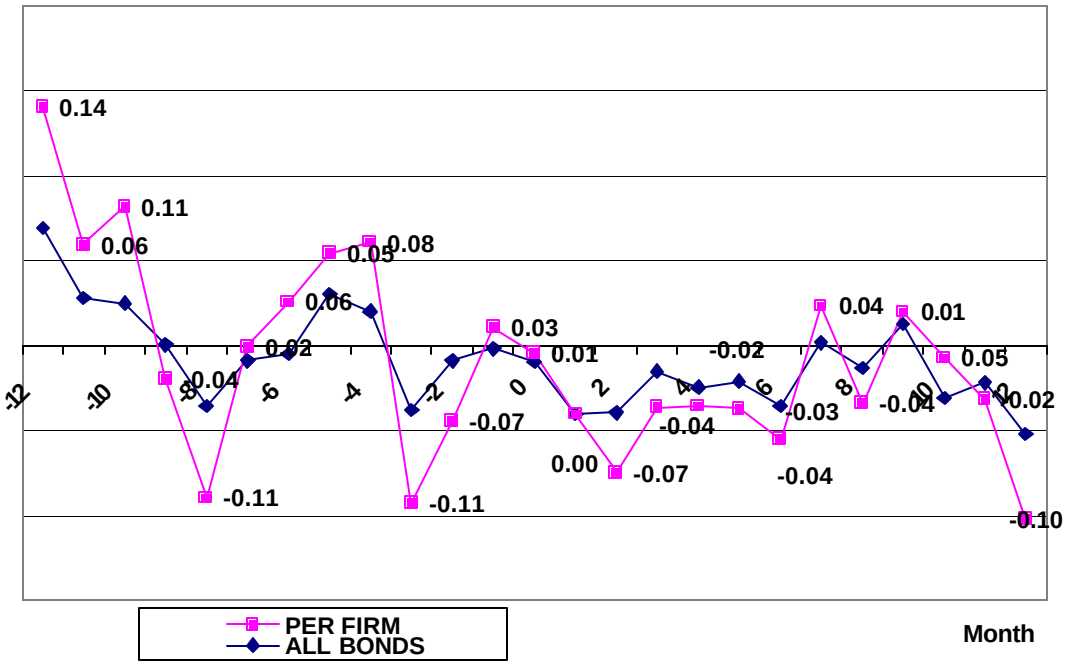

Figure 3 Distribution of risk-maturity-adjusted abnormal monthly bond market returns of the outstanding nonconvertible bonds of the acquirer firms around the month of the merger announcement.

Abnormal returns for all the non-convertible bonds of a sample of acquirer firms that announced and completed a merger/acquisition between 1979 to April 30, 1998 and matched to the spin-off sample by year of announcement and industry of parent firm in the spin-off. Mergers/acquisitions are identified from the *SDC Platinum Mergers and Acquisition* database. All nonconvertible bonds of the parent firm that have trader quotes available in and around the merger announcement month are identified from the monthly bond price data in the Fixed Income Database (FID). Monthly total return is obtained from the Fixed Income Database for each event month. The announcement month is identified as "month 0". A risk-maturity adjusted benchmark index is constructed from ten Lehman Brothers Corporate Bond indexes in the dimensions of risk and maturity. For each bond the return on the risk- maturity benchmark index is subtracted from the corresponding monthly raw return in each event month to calculate the abnormal return. To calculate the abnormal returns on a per firm basis, values are first aggregated across all bonds for the same firm and then averaged across firms in each event month.

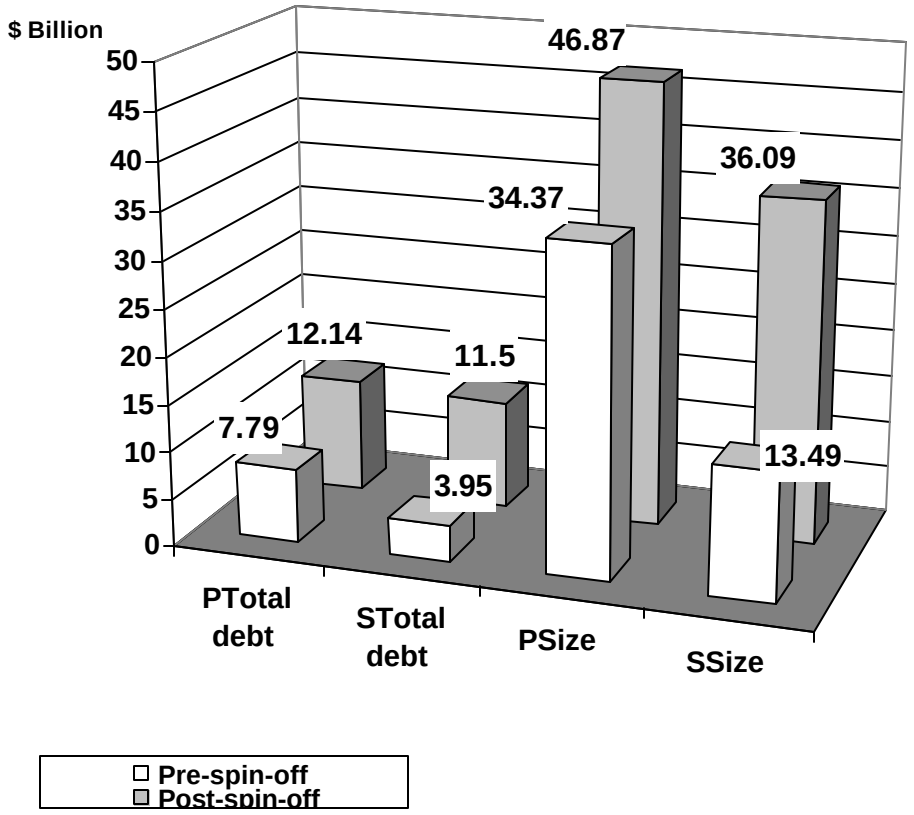

Figure 4 Change in firm characteristics of the parent and subsidiary firms.

This figure shows the changes in the parent and subsidiary firms' characteristics (i.e., Total debt and size) from the pre-spin-off year, i.e. in the year prior to the spin-off (t-1) to the post-spin-off year. The spin-off sample consists of 37 parent firms that announced and completed a spin-off between 1979 to April 30, 1998. Spin-offs are identified from the CRSP tapes, the *Security Data Company's (SDC) Worldwide Acquisition database*, publications such as *Moody's Dividend Records*, *Mergers and Acquisitions*, and news wires and articles from *Lexis-Nexis* and the *Wall Street Journal* for the period 1979 to early 1998. The final spin-off sample consists of only those parent firms that have trader-quotes available in the spin-off announcement month for their publicly traded outstanding nonconvertible bonds. Total debt is calculated as the sum of long-term debt and current liabilities. Size is measured in terms of the assets of the firm.

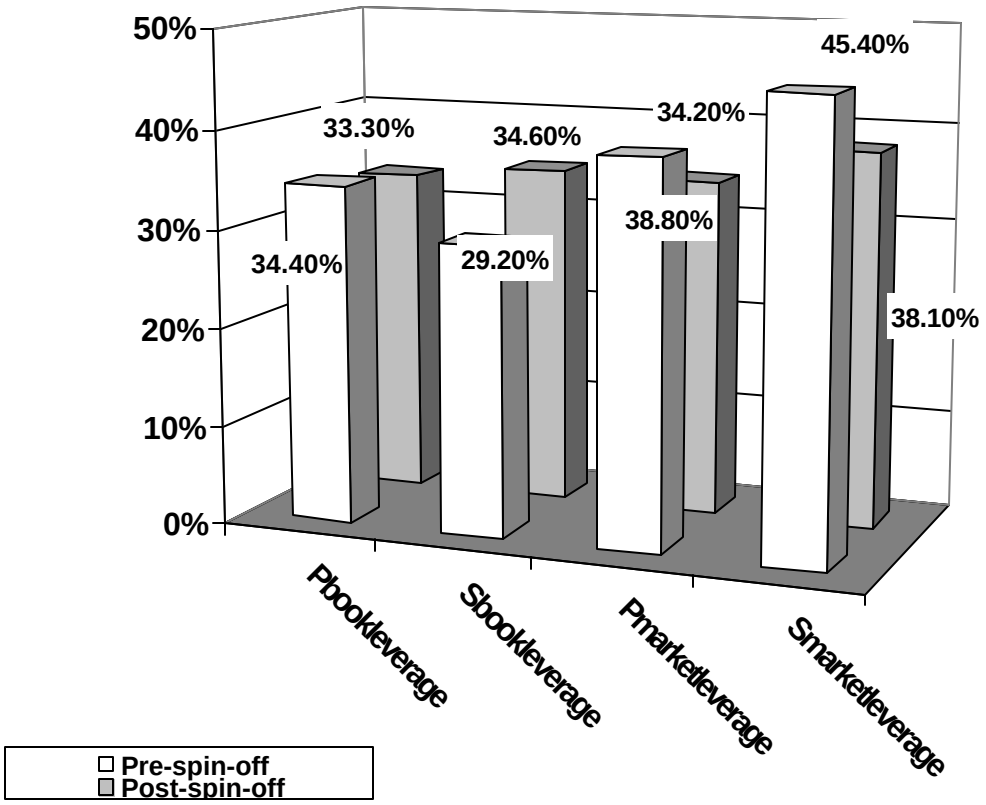

Figure 5 Change in leverage of the parent and subsidiary firms.

This figure shows the changes in the parent and subsidiary firms' leverage from the pre-spin-off year, i.e. in the year prior to the spin-off (t-1) to the post-spin-off year. The spin-off sample consists of 37 parent firms that announced and completed a spin-off between 1979 to April 30, 1998. Spin-offs are identified from the CRSP tapes, the *Security Data Company's (SDC) Worldwide Acquisition database*, publications such as *Moody's Dividend Records, Mergers and Acquisitions*, and news wires and articles from *Lexis-Nexis* and the *Wall Street Journal* for the period 1979 to early 1998. The final spin-off sample consists of only those parent firms that have trader-quotes available in the spin-off announcement month for their publicly traded outstanding nonconvertible bonds. Book leverage is calculated as the ratio of long term debt and current liabilities to book value of assets. Market leverage is defined as the ratio of long-term debt and current liabilities to the sum of the market value of equity and book value of debt.

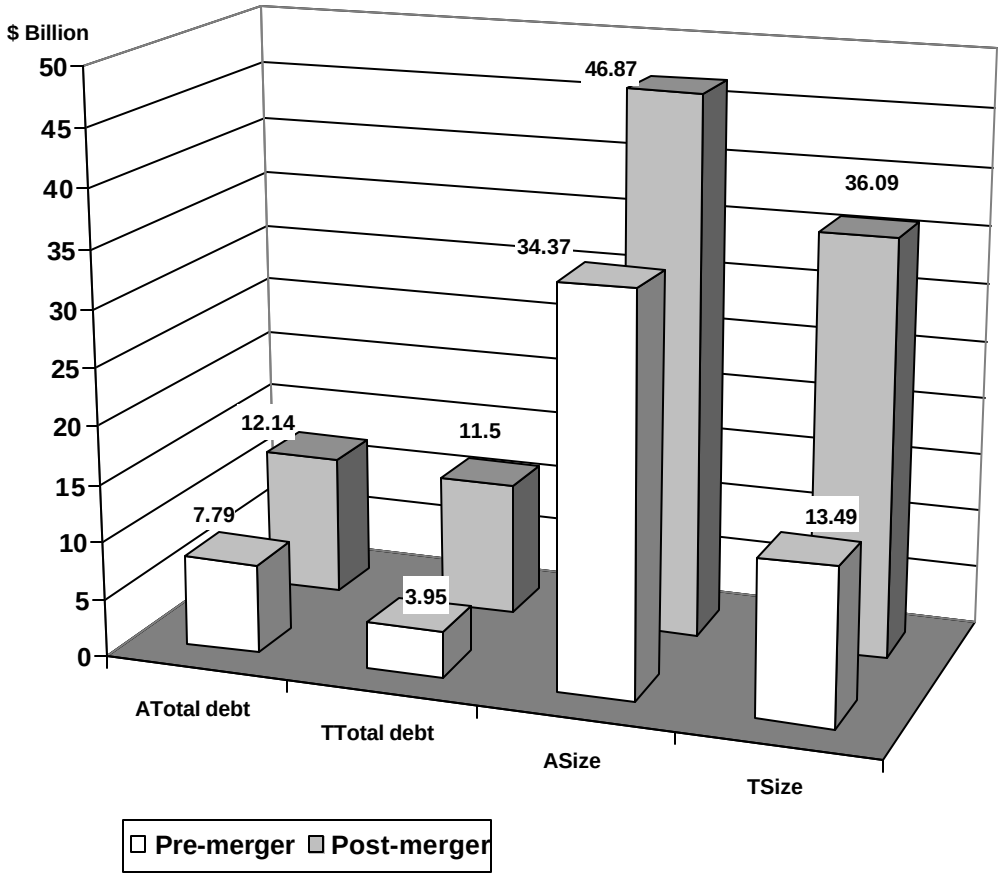

Figure 6 Change in firm characteristics of the acquirer and target firms.

This figure shows the changes in the acquirer and target firms' characteristics (i.e., Total debt and size) from the pre-merger/acquisition year, i.e. in the year prior to the merger/acquisition (t-1) to the post-merger/acquisition year. The mergers/acquisition sample includes acquirer firms that announced and completed a merger/ acquisition between 1979 to April 30, 1998 and are matched to the spin-off sample by year of announcement and industry of parent firm. Mergers/acquisitions are identified from the SDC Platinum Mergers and Acquisition database. Total debt is calculated as the sum of long-term debt and current liabilities. Size is measured in terms of the assets of the firm.

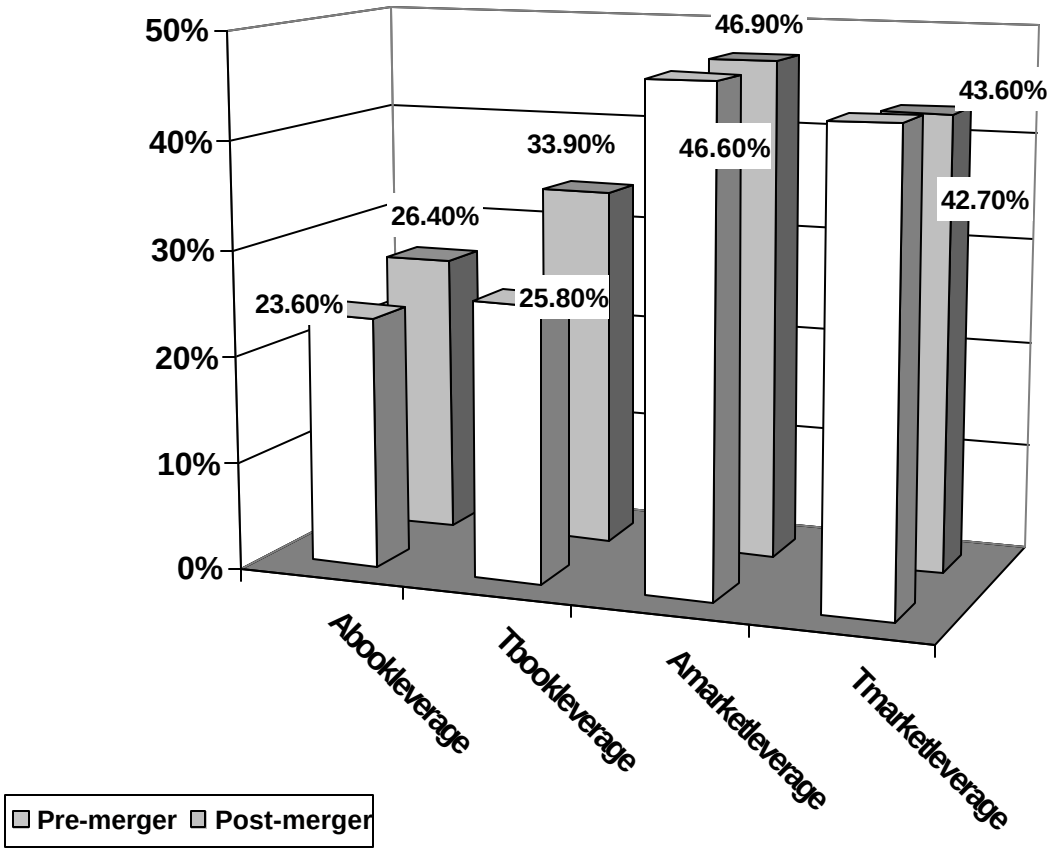

Figure 7 Change in leverage of the acquirer and target firms.

This figure shows the changes in the acquirer and target firms' characteristics (i.e., Total debt and size) from the pre-merger/acquisition year, i.e. in the year prior to the merger/acquisition (t-1) to the post-merger/acquisition year. The mergers/acquisition sample includes acquirer firms that announced and completed a merger/ acquisition between 1979 to April 30, 1998 and are matched to the spin-off sample by year of announcement and industry of parent firm. Mergers/acquisitions are identified from the SDC Platinum Mergers and Acquisition database. Book leverage is calculated as the ratio of long term debt and current liabilities to book value of assets. Market leverage is defined as the ratio of long-term debt and current liabilities to the sum of the market value of equity and book value of debt.

Appendix

Skybox International, Litton Industries, Ethyl Corporation, and AT&T are examples of spin-offs proposed following the October 1992 spin-off announcement by Marriott Corporation affecting the outstanding debtholders of the parent firm.

Skybox International, Inc.

Brooke Group Ltd. completed a spin-off to stockholders of its Skybox International subsidiary (a manufacturer and distributor of trading cards and related accessories). The stated purpose of the spin-off was to reduce Brooke Group's obligations and benefit stockholders. Brooke Group's primary direct creditors were the holders of Contingent Value Rights. The creditors had a contingent value fixed on November 15, 1993 by reference to Brooke's stock price for the period which preceded that date, reduced by the value of any dividend paid with respect to that stock. On September 20, 1993, before the Skybox spin-off, the aggregate value of these rights was approximately $46.2 million. Brooke Group fixed the value of these rights at an aggregate of approximately $1.1 million.[5]

[5] Maria Mooshil, *Brooke Group Rights Holders Cry Foul at 36c-Redemption Price*, Dow Jones News, Oct. 15,1993.

Litton Industries, Inc.

In June 1993, Litton Industries, Inc. announced its plan to spin-off by the end of June 1993 its growing commercial oil-field information services and industrial automation businesses into a new company (Western Atlas, Inc.), with Litton to continue as an aerospace/defense company. Litton's shares rose 14% following the announcement of the spin-off.[6] The spin-off was completed in March 1994. To implement the spin-off, Litton called for the redemption of its outstanding zero-coupon convertible subordinated notes. Pursuant to the conversion terms of the notes, approximately 99.8% of the notes were converted into common stock in late July 1993. The remaining notes were redeemed for cash. Moody's and Standard & Poor's initially placed approximately $1 billion of Litton's debt securities on credit-watch for a possible downgrade because of the planned spin-off and ultimately downgraded this debt. A Standard & Poor's analyst projected that "the defense business is generating a lot of cash flow, but its long-term prospects are weaker."

Ethyl Corporation

Following Ethyl Corporation's announcement of a contemplated spin-off to its shareholders of its Albermarle Corporation’s chemical businesses, Ethyl's approximately $400 million of rated debt was placed on credit-watch with negative implications as a result of the transaction, reflecting the uneven burden

[6] *Litton to Separate Commercial Defense Ops in Spin-off,* Bloomberg Business news, June 18, 1993.

of the debt to remain on Ethyl and reduced earnings diversity.[7] In January 1994, Moody's downgraded Ethyl's senior notes from A3 to Baa3, stating that "the spin-off action will substantially change the business mix of Ethyl, with negative implications for the risk profile of the Company." In March 1994 when the spin-off was completed, Standard & Poor's and Duff & Phleps followed suit, lowering Ethyl's senior debt rating.

AT&T

In October 2000, AT&T announced its intention to restructure by splitting its four businesses including consumer long distance, business services, cable, and wireless. The restructuring would entail a complex series of tracking stocks and spin-offs. Moody's and Standard & Poor's put AT&T debt on a credit-watch with negative implications, meaning the company's ratings could be lowered at any time. Standard & Poor's downgraded AT&T's long-term debt. At the time of the announcement AT&T had a heavy debt load of $62 billion on its balance sheet. The credit agencies were concerned about the capital structures of the newly created entities and how AT&T would allocate debt to each unit. Credit ratings are important to corporations, especially those with a large amount of debt, because they affect a company's ability to tap the public markets to refinance that debt. For AT&T, lower ratings could make it more expensive to raise more money and could hinder its ability to get financing. AT&T, whose short-term debt was about $33 billion at the time of announcement, needed to roll over or

[7] *S and P Places Ethyl Corp's Debt on Creditwatch; Negative*, Bloomberg Business news, Sept. 17, 1993.

refinance some of that debt as often as every 30 to 90 days. But each time the rating is lowered, AT&T's debt became less attractive to bondholders and the company paid a higher interest rate to holders. Bond market analysts and investors anticipated that a fragmented AT&T would not be strong enough to support the A1/AA- ratings of the parent for the individual units. Following the announcement yield spreads to Treasuries on AT&T's debt issues widened about 0.40 to 0.50 percentage points and the volatility of AT&T bonds increased.

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